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# INSTALLATION RESTORATION PROGRAM

AD-A277 697



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## FINAL EXPANDED SITE INVESTIGATION REPORT

148th Combat Communications Squadron  
Ontario Air National Guard Station  
California Air National Guard  
Ontario, California

November 1993

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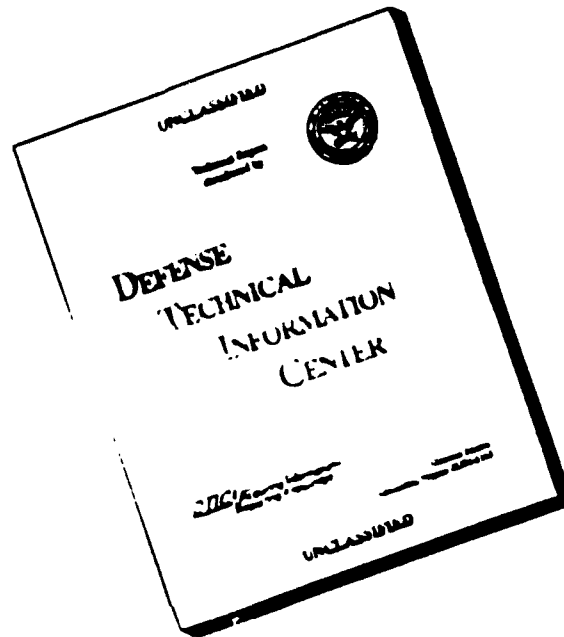


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1. Agency Use Only (Leave Blank)		2. Report Date <i>NOVEMBER 1993</i>	
		3. Report Type and Dates Covered <i>EXPANDED SITE INVESTIGATION</i>	
4. Title and Subtitle <i>FINDS EXPANDED SITE INVESTIGATION WITH CURRENT SURVEILLANCE AND MONITORING OAKRIDGE, VA</i>		5. Funding Numbers	
6. Author(s) <i>The Earth Technology Corporation 673 Emory Valley Road Oak Ridge, TN 37830</i>			
7. Performing Organization Name(s) and Address(es)		8. Performing Organization Report Number	
9. Sponsoring/Monitoring Agency Name(s) and Address(es) <i>Hazardous Waste Remedial Action Program Oak Ridge TN  Air National Guard Readiness Center Andrews Air Force Base, Maryland 20331</i>		10. Sponsoring/Monitoring Agency Report Number	
11. Supplemental Notes			
12. Distribution/Availability Statement  <i>Approved for public release; distribution is unlimited</i>		12b. Distribution Code	
13. Abstract (maximum 200 words) <i>INVESTIGATION of one site, Site No. 1 - HIGH BOMB VEHICLE (HVB) (MILITARY), from June 1 to Sept. 10 1992. Investigation included soil sampling, soil boring, and monitoring well installation. No other data were collected. About 100 pounds of soil samples were collected. The site was recommended for the site.</i>			
14. Subject Terms <i>INVESTIGATION, Remedial Action Program, Air National Guard, REMEDIAL ACTION, HVB, Site No. 1, HVB, Site No. 1, HVB, Site No. 1, ANG STATION, CARROLLTON</i>		15. Number of Pages <i>148</i>	
		16. Price Code	
17. Security Classification of Report  <i>Unclassified</i>	18. Security Classification of this Page  <i>Unclassified</i>	19. Security Classification of Abstract  <i>Unclassified</i>	20. Limitation of Abstract  <i>None</i>

# **INSTALLATION RESTORATION PROGRAM EXPANDED SITE INVESTIGATION REPORT**

**148th Combat Communications Squadron  
Ontario Air National Guard Station  
California Air National Guard  
Ontario, California**

**November 1993**

**Prepared for  
National Guard Bureau  
Andrews Air Force Base, Maryland 20331-6008**

**Prepared by  
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**with  
HAZWRAP Support Contractor Office  
Oak Ridge, Tennessee  
Operated by Martin Marietta Energy Systems, Inc.  
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## ACRONYMS

AGE	aerospace ground equipment
ANG	Air National Guard
ASTM	American Society for Testing and Materials
bgs	below ground surface
CCSQ	Combat Communications Squadron
cm/sec	centimeters per second
CRDL	contract-required detection limit
CRQL	contract-required quantification limit
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DRMO	Defense Reutilization and Marketing Office
ESI	Expanded Site Investigation
°F	degrees Fahrenheit
ft	feet
GC	Gas chromatograph
HARM	Hazard Assessment Rating Methodology
HAZWRAP	Hazardous Waste Remedial Actions Program
IAP	International Airport
in.	inch(es)
IRP	Installation Restoration Program
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
MSL	mean sea level
PA	Preliminary Assessment
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
PID	photoionization detector
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
SOP	Standard Operating Procedure
TAL	target analyte list
TCA	trichloroethane
TCE	trichloroethene
TCL	target compound list
TVHC	total volatile hydrocarbons
USAF	United States Air Force
VOA	volatile organic analyte

## **EXECUTIVE SUMMARY**

A Preliminary Assessment conducted in August 1990 by Science & Technology, Inc. at the Ontario Air National Guard (ANG) Station in Ontario, California, indicated a potential for release of hazardous materials to the environment. Solvents and other chemicals may have been spilled during vehicle maintenance operations in an area designated Site 1 - Area Behind Vehicle Maintenance. Science & Technology, Inc. recommended that an Expanded Site Investigation (ESI) be conducted. The ESI was conducted June 1 to September 10, 1992, by The Earth Technology Corporation and Radian Corporation. The ESI consisted of a soil organic vapor survey followed by the drilling and sampling of six boreholes and two monitoring wells to confirm the presence or absence of contamination at Site 1 and in upgradient groundwater.

A soil gas survey was performed by Tracer Research Corporation June 1 to 4, 1992, consisting of sampling and analysis of soil vapor at 34 locations from probes driven approximately 5 feet (ft) into the ground. Five of the ten target analyte classes were found at Site 1. Trichloroethane (TCA) and tetrachloroethene (PCE) were detected in nearly all of the samples but were detected at approximately equal concentrations in ambient air control samples. Trichloroethene (TCE) was detected at 0.0007 micrograms per liter ( $\mu\text{g/L}$ ) in two samples, and toluene and total volatile hydrocarbons (TVHC) were detected at 10  $\mu\text{g/L}$  in one sample.

The site has been filled and graded so that the original topography is no longer apparent. The original creek bank, where hazardous materials could have been spilled or disposed of, was interpreted to have been gently sloping, with approximately 25 ft of fill required adjacent to the new concrete-lined channel and original surficial material exposed at the eastern boundary of Site 1, adjacent to the vehicle maintenance building. Vadose zone soils underlying the fill were found to consist of alternating coarse- and fine-grained layers. Groundwater under the station was approximately 250 ft below ground surface with a gradient of 0.002 ft/ft south, 11 degrees west.

No combustible vapor levels exceeding 0.4 parts per million over background were detected during boring activities. No organic analytes were detected in soil samples other than methylene chloride, acetone, and a phthalate, which were also detected in associated field and laboratory blanks. Organic compounds detected in water samples from the down-gradient monitoring well were limited to methylene chloride and a phthalate, which were also detected in the associated field and laboratory blanks. In addition to methylene chloride, acetone, phthalates, and phenol, which were

also detected in the associated field and laboratory blanks, the background well contained 2 µg/L concentrations of PCE during both sampling rounds. The PCE detected in the background well, although below the state and federal drinking water standard of 5 µg/L, was the only organic analyte found not attributable to laboratory contamination. Therefore, Site 1 at the Ontario ANG Station is not considered a probable source contributing to the regional groundwater contamination problem. As there were no contaminants with levels of concern, a preliminary risk evaluation was not done.

## **1.0 INTRODUCTION**

### **1.1 PURPOSE OF REPORT**

In August 1990, Science & Technology, Inc. conducted a Preliminary Assessment (PA) at the Ontario Air National Guard (ANG) Station (the station) that indicated a potential for release of hazardous constituents to the environment in the area west of the station vehicle maintenance shop and shed (hereinafter referred to as Site 1). Based on the PA results, Site 1 was recommended for an Expanded Site Investigation (ESI). The ESI was conducted to confirm the presence or absence of contamination at Site 1 and provide data to facilitate decisions regarding suspected problems associated with past hazardous waste management practices at Site 1. This document reports the findings of the ESI.

### **1.2 REPORT ORGANIZATION**

This chapter introduces the report and its organization; describes the site, its history, and previous investigation activities at the site; and describes the regional setting. Chapter 2 describes the field activities performed for the ESI. Chapter 3 gives the results of the field activities and discusses their significance. Chapter 4 summarizes the results and conclusions of the investigation. A reference list follows Chapter 4. Soil boring logs, well construction logs, well development/purge logs, soil organic vapor survey report, Chain-of-Custody records, laboratory analytical records, and data validation reports are provided in appendices.

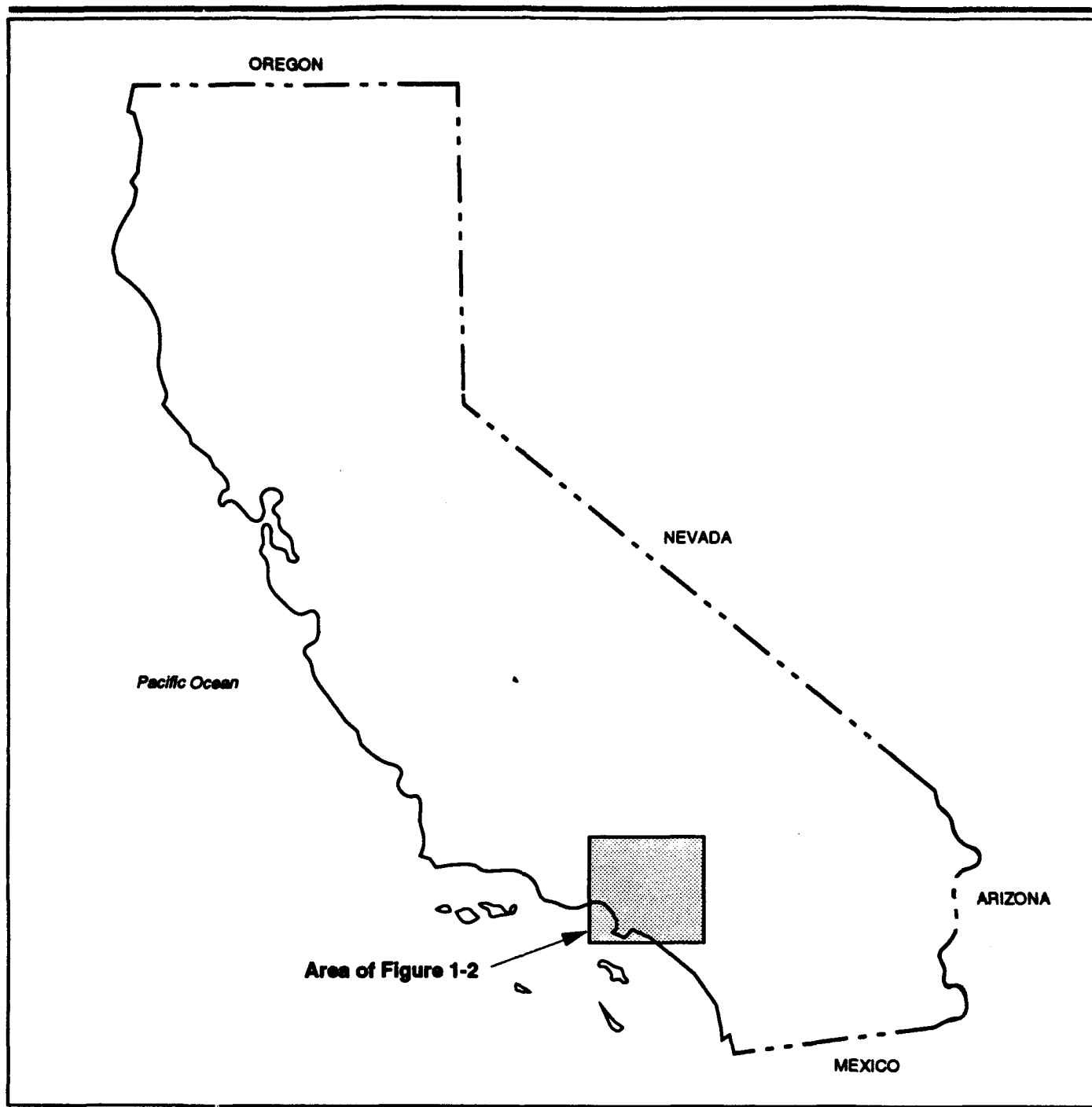
### **1.3 STATION BACKGROUND**

The following section describes the station and past usage of the site.

#### **1.3.1 Station Location**

The Ontario ANG Station is located in southern California approximately 35 miles east of Los Angeles (Figures 1-1 and 1-2). The station occupies approximately 13 acres adjacent to the southern boundary of the Ontario International Airport (IAP) in Ontario, California. The station is on Acacia Street near Archibald Avenue, and nearby highways are Interstate 10, State Route 60, and Interstate 15 (Figure 1-3). The Cucamonga Creek channel bisects the station from north to south,





**General Location Map**

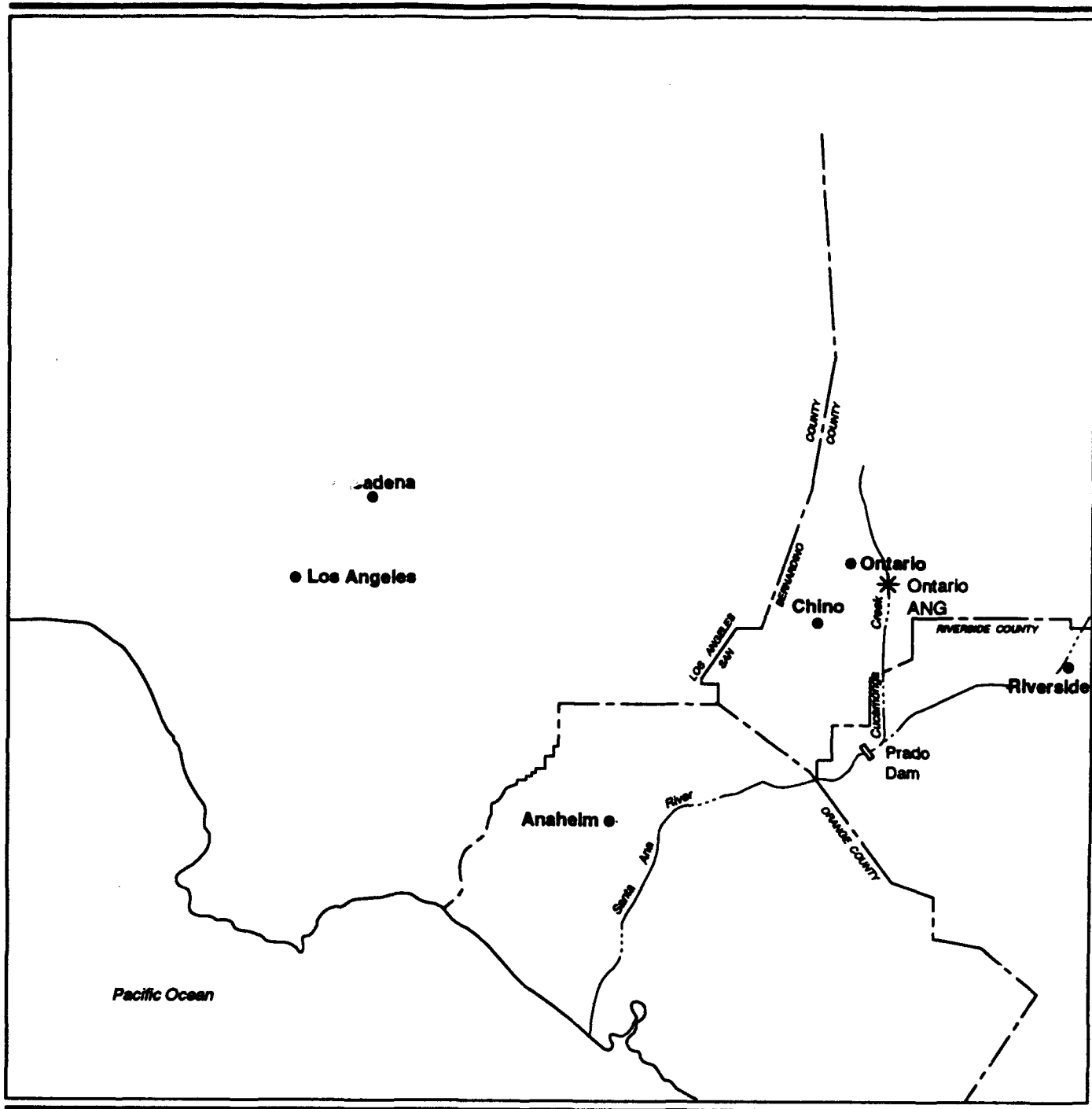
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Ontario ANG Station

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**Figure 1-1**



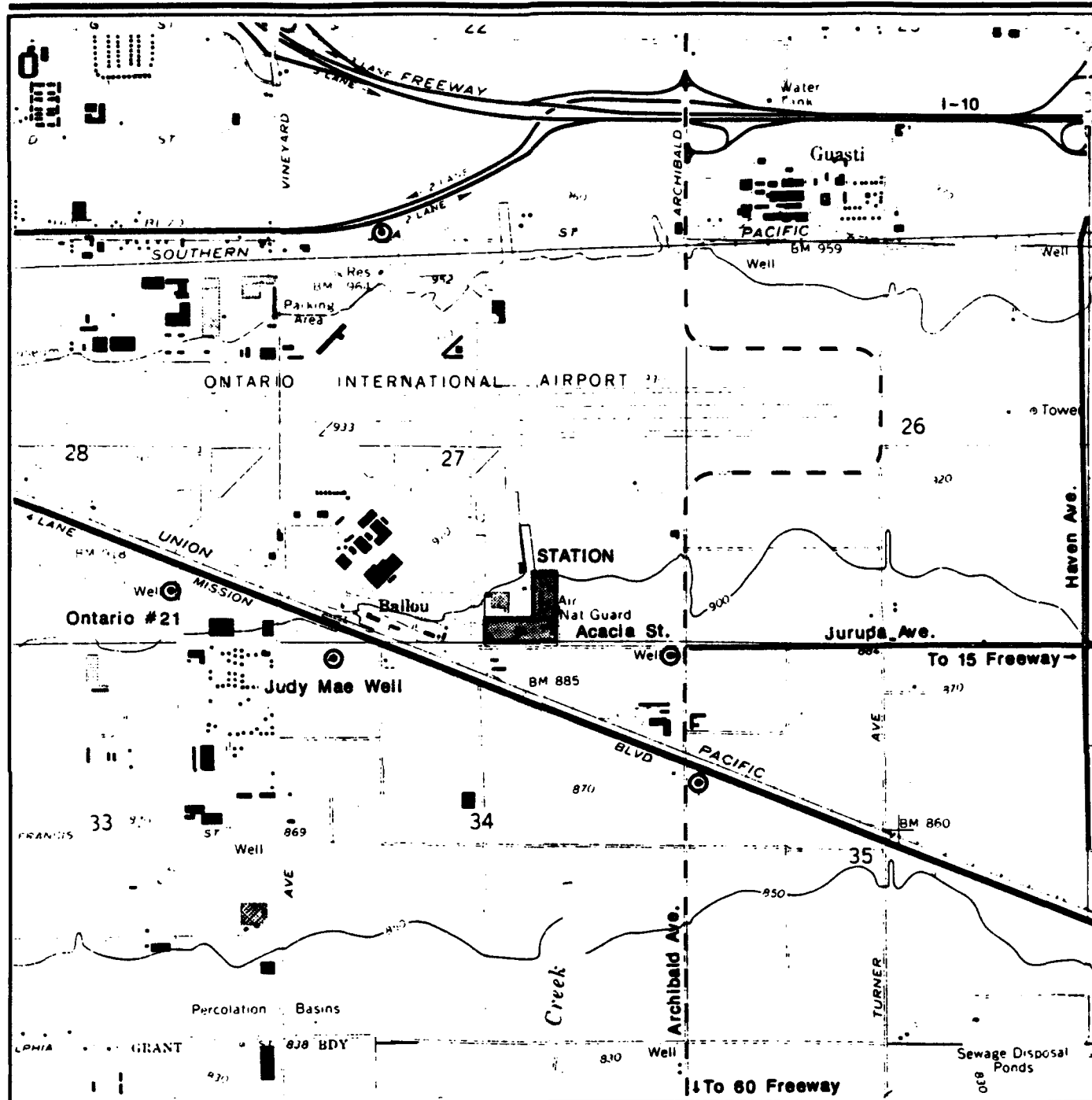


**Regional Location Map**



**Ontario ANG Station**

**Figure 1-2**



# EXPLANATION

⊙ Production Well in Vicinity

## Location Map

Ontario ANG Station

Figure 1-3



Map Source: U. S. Geological Survey, 1981;  
Dames & Moore, 1990.

with the majority of buildings east of the creek (Figure 1-4). The station is completely fenced and has controlled access.

### **1.3.2 Station History**

The 148th Combat Communications Squadron (CCSQ) has been at the station since 1984. The responsibilities of the 148th CCSQ are to develop and maintain the capability to install, operate, and maintain mobile communication facilities that provide interbase and intrabase communications in support of tactical air forces and in the event of state emergencies.

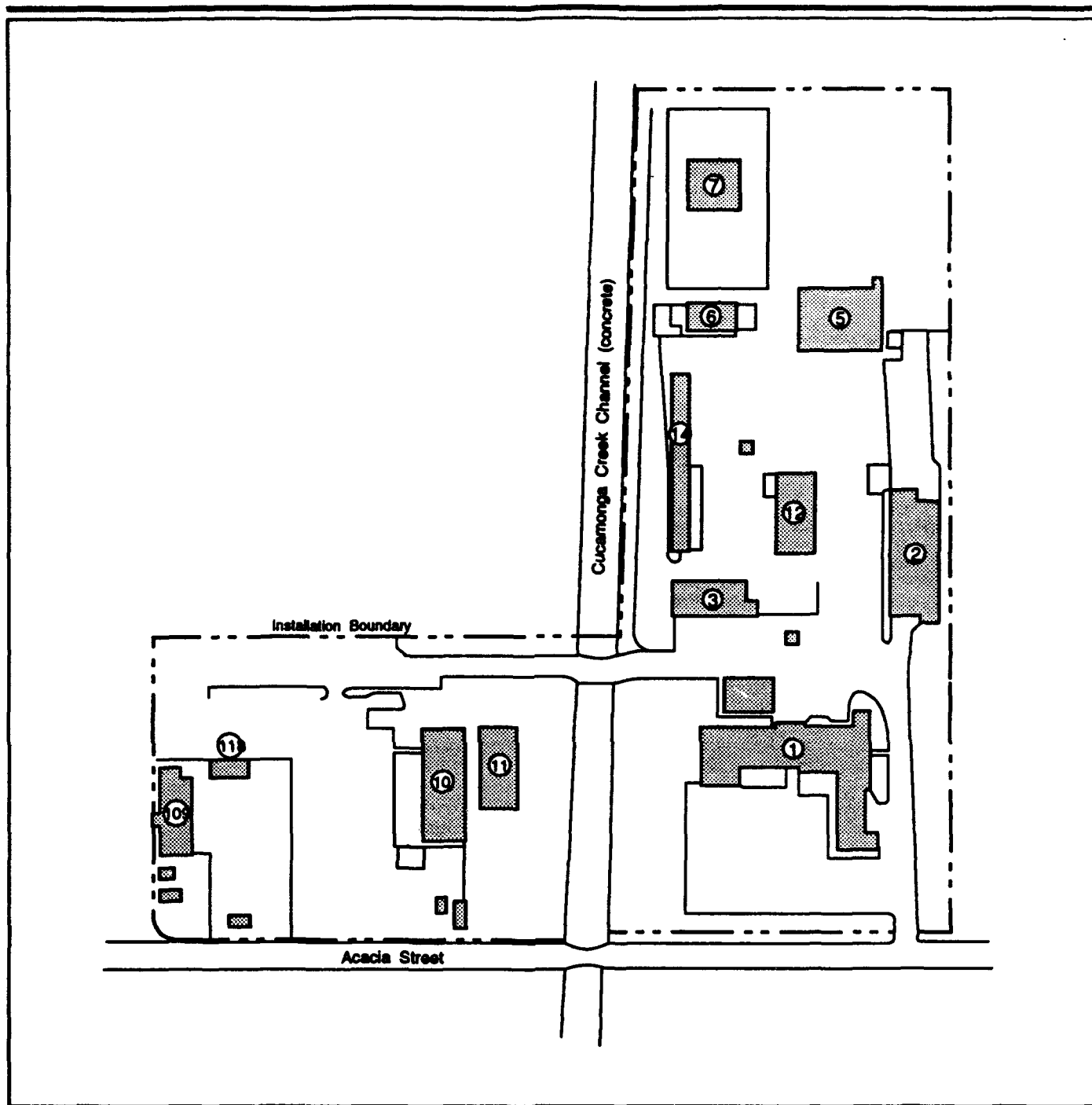
Before 1984, the 196th Tactical Air Support Group/163rd Tactical Air Support Group occupied the property. This group was organized at the Ontario IAP on July 10, 1952, and was moved to March Air Force Base in 1983. The Tactical Air Support Group(s) practiced operations including maintenance of aircraft, vehicles, aerospace ground equipment (AGE), as well as nondestructive inspection testing. The waste materials that were generated from these operations included fuels, paints, solvents, thinners, and oils.

Prior to 1948, the Army maintained the present station property. Army operations conducted there are not documented.

Figure 1-4 is a facility map of the station as it presently exists. Before Cucamonga Creek was rechanneled in the early 1980s, the creek bed was 25 to 30 feet (ft) east of its present position. The original, gently sloping creek bank reached to within 5 ft of the west wall of the vehicle maintenance building and the building was flooded occasionally. The channel shifting involved the excavation of soil along the west side of the original creek bed and the addition of fill material over the original creek bed and bank.

### **1.3.3 Hazardous Waste Disposal Practices**

According to the PA report, Site 1 was used for disposal of small amounts of waste materials generated from vehicle maintenance and power production shops. The wastes generated and disposed of at Site 1 consisted of small quantities of waste oils, fuels, paints, and solvents. Disposal took place from the 1950s until the early 1980s.



#### EXPLANATION

- |                       |                             |
|-----------------------|-----------------------------|
| 1 Administration      | 10 Dining Hall              |
| 2 Supply Building     | 11 Weather Flight           |
| 3 Vehicle Maintenance | 12 Paint Shed               |
| 5 CE Maintenance      | 14 Vehicle Maintenance Shed |
| 6 AGE Maintenance     | 109 State Maintenance       |
| 7 Maintenance Shops   | 118 Storage                 |

#### Ontario Air National Guard Station Facility Map

Ontario ANG Station

Figure 1-4



In the past, liquid waste was generally poured onto the ground at Site 1 and often allowed to drain into the creek. Due to the high permeability of the soils in the area, much of the released material may have seeped into the ground.

Present waste management practices involve the frequent handling of potentially hazardous waste. This waste is being disposed of through either a contractor or the Defense Reutilization and Marketing Office (DRMO) in accordance with applicable regulations. The hazardous wastes include oils, fuels, solvents, thinners, and paint. The quantities of hazardous waste generated from washrack activity and the routine maintenance of vehicles, generators, and other types of equipment vary.

There are two oil/water separators at the station, which are no longer in use. One is on the west side of the vehicle maintenance shed and the other is on the west side of AGE maintenance building (see Figure 1-4 for building locations). These oil/water separators emptied into the Cucamonga Creek drainage channel.

#### **1.4 PREVIOUS PROGRAM ACTIVITIES**

As part of the Department of Defense (DOD) Installation Restoration Program (IRP), a PA was completed by Science & Technology, Inc. (1990). The PA identified and evaluated suspected problems associated with past hazardous waste handling procedures, disposal sites, and spill sites on station property. During the PA, an inspection of the station was conducted, existing environmental data were reviewed, station records concerning the use of hazardous materials and generation of hazardous wastes were analyzed, and interviews were conducted with current station personnel who had knowledge of past waste handling and disposal techniques. Pertinent information collected and analyzed as part of the PA included a records search of the history of the station; the local geological, hydrological, and meteorological conditions that may influence contaminant migration; and ecological settings indicating environmentally sensitive conditions.

The station PA included a description of the United States Air Force (USAF) Hazard Assessment Rating Methodology (HARM). The USAF HARM is used to rank sites suspected of being contaminated with hazardous substances. Site 1 was assigned a score of 50 out of 100. The HARM rating for Site 1 disclosed that there are several water wells within 3,000 ft of the station. The groundwater is used for drinking, irrigation, and livestock watering; however,

municipal water is available to the population living near the station. Over 1,000 residents within a 3-mile radius of the station receive their water supply from aquifers. Cucamonga Creek, the nearest body of surface water, which bisects the station, is used primarily for agricultural and industrial purposes. The land within a 1-mile radius of the station is zoned as commercial and agricultural. There are no endangered or threatened species within a 1-mile radius of the station.

## **1.5 REGIONAL INVESTIGATION AREA**

This section provides information on the regional setting of the station.

### **1.5.1 Environmental Setting**

The station is approximately 50 miles from the coast in an inland valley. Ontario is in the northern part of the Chino Basin, which is bounded on the north by the San Gabriel Mountains, on the west by the Puente Hills, and on the south by the Santa Ana Mountains. The Chino Basin is part of the upper Santa Ana River drainage. The station is 890 ft above mean sea level (MSL) and slopes generally to the south-southwest at approximately 1.5 percent.

The city of Ontario is located northwest of Ontario IAP and has a population of approximately 115,000. Ontario is the second most populous city in San Bernardino County. The number of personnel at the station is approximately 29 on weekdays and 161 on Unit Training Assembly weekends. Land use west and south of the station is generally industrial/commercial, north of the station is Ontario IAP, and east of the station is historically agricultural but rapidly developing to industrial/commercial. Southeast of the station, between Ontario and Riverside, is an agricultural preserve area.

The climate in the Ontario area is Mediterranean-type, characterized by warm to hot summers and temperate winters with moderate precipitation (Kessali, 1942). Data from California State Polytechnic University, Pomona, show that the inland areas of southern California in the Los Angeles Basin at elevations below 1,000 ft have an annual average temperature of 62.8 degrees Fahrenheit (°F). The average temperatures in this area range from a low of 52.4°F in January to a high of 74.9°F in August. Average annual precipitation in the area of the station is 17.0 inches (in.), and mean annual lake evaporation is 60 in.; therefore, the net precipitation is

-43 in. per year. The maximum rainfall intensity based on a 24-hour, 1-year rainfall is 1.5 in. (U.S. Department of Commerce, 1979, 1982).

### **1.5.2 Regional Geology and Hydrogeology**

The Chino Basin is in the Peninsular Ranges geomorphic province at its boundary with the Transverse Ranges geomorphic province (Figures 1-5 and 1-6). The Peninsular Ranges province contains north-northwest-trending mountain ranges and faults that end abruptly or merge into the east-trending faults bounding the east-trending mountain ranges of the Transverse Ranges Province.

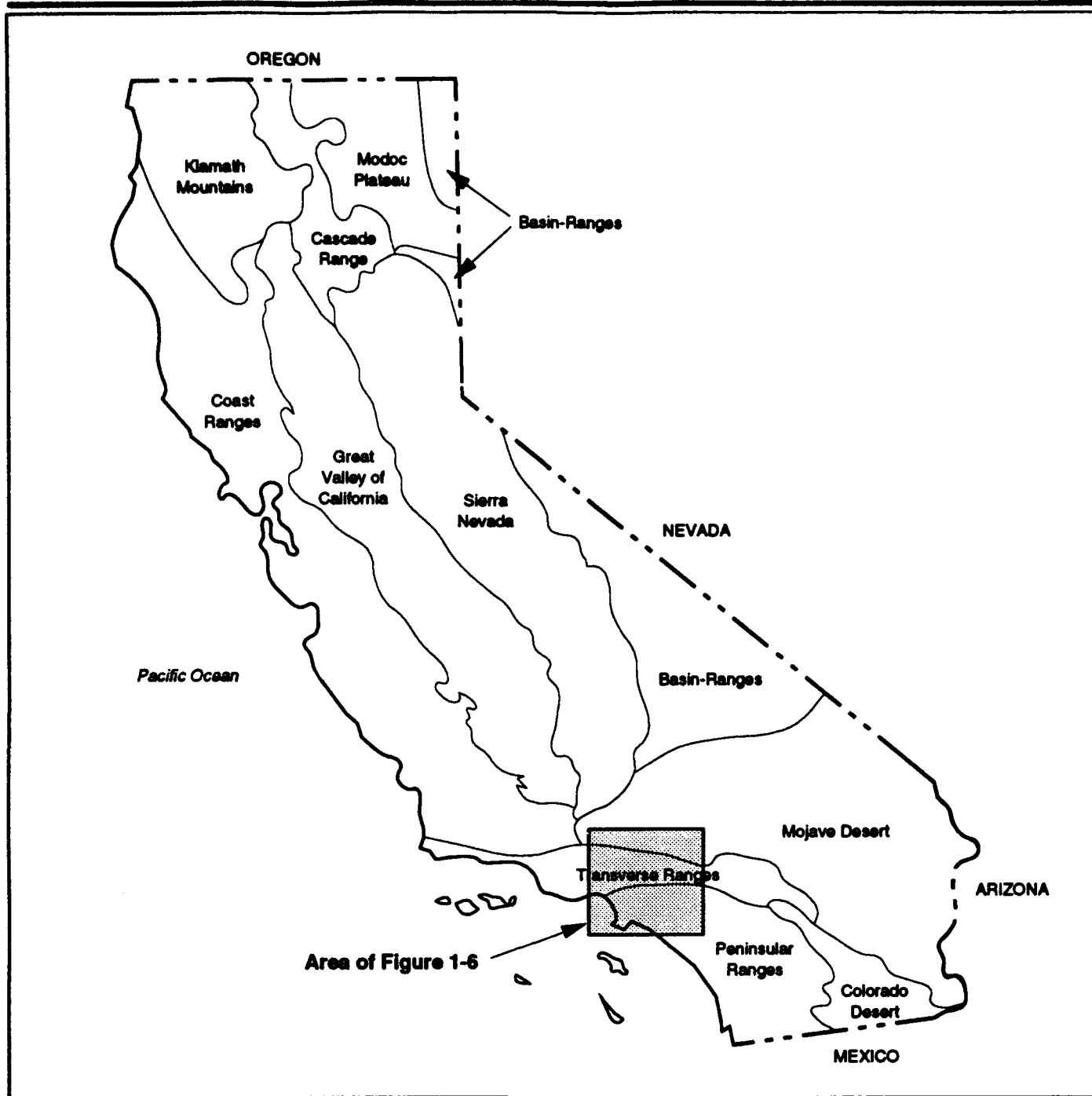
The Los Angeles and Chino-San Bernardino basins were down-dropped in the late Cenozoic era during the uplift of the adjacent mountains. Alluvial sediments in the Chino Basin average more than 800 ft thick in the central area of the basin and reach a maximum thickness of more than 1,300 ft northeast of Ontario (Fife et al., 1976). The sediments, which were eroded from the San Gabriel mountains to the north as they were uplifted, are generally coarse and poorly sorted with rapid facies changes and discontinuous lenses of finer-grained sediments.

Surficial deposits in the station area include fine- to medium-grained wind-blown sand and coarser sand and gravel deposited in alluvial fans and washes (Bortugno and Spittler, 1986; Cox and Morton, 1978). Tertiary marine siltstone, sandstone, and shale of the Puente Formation have been encountered in deep wells in the western part of the basin, but in wells east of Archibald Avenue, Quaternary alluvium directly overlies quartz diorite basement rock (French, 1972).

The Chino groundwater basin is bounded by the impermeable rock of mountains and hills on the north, west, and south and by the Rialto-Colton barrier fault on the east and the San Jose fault on the northwest (Dutcher and Garrett, 1963; Koehler, 1983). Groundwater in the Chino Basin occurs in permeable alluvial sediments interbedded with discontinuous lenses of fine-grained material. Groundwater is unconfined except in the southernmost part of the basin, and the water table in the area of the station is approximately 250 ft below ground surface (bgs).

Natural and artificial recharge occurs primarily at the northern margin of the basin by infiltration of runoff from the San Gabriel Mountains and state water project water. In addition, recharge occurs as flow around the southern end of the Rialto-Colton barrier near Slover Mountain. Discharge occurs as pumpage from wells for agricultural and municipal use and as outflow from the basin to





**General Geomorphic  
Location Map**

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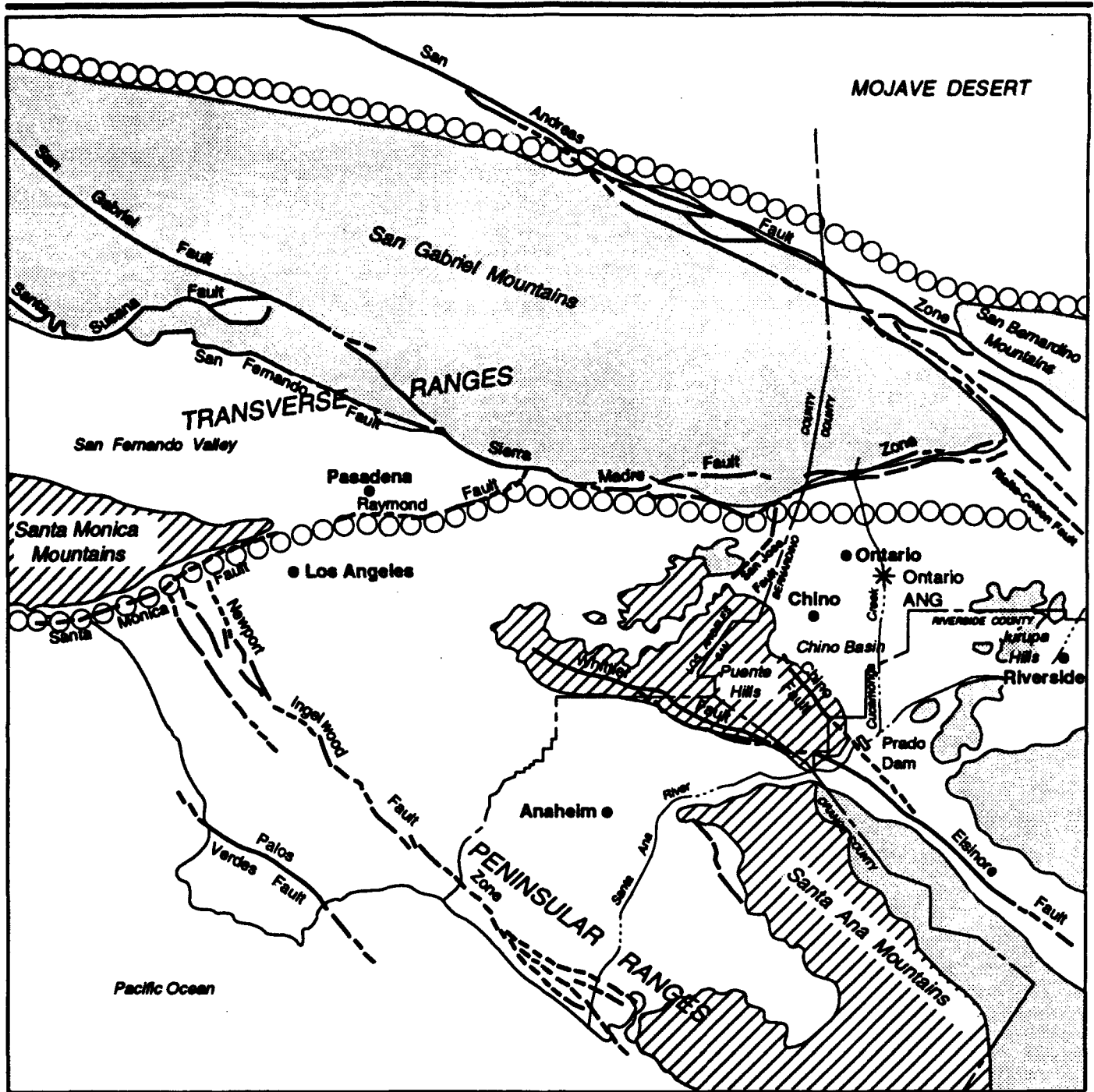
Ontario ANG Station

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**Figure 1-5**



Reference: Jenkins, 1938.



#### EXPLANATION

- Alluvium (unconsolidated deposits of Quaternary age)
- Sedimentary Rock (marine and continental rocks of Tertiary age)
- Basement Complex (igneous and metamorphic rocks of pre-Tertiary age)

- Fault, dashed where location approximate or fault covered
- Geomorphic Province Boundary



References: French, 1972; Jenkins, 1938; Koehler, 1983.

#### Generalized Regional Geologic Map

Ontario ANG Station

Figure 1-6

the Santa Ana River at Prado Dam, approximately 7 miles south of the station. Surface water runoff from the station flows directly into Cucamonga Creek, a concrete-lined flood control channel that flows south to the Santa Ana River. Although the groundwater flow direction adjacent to the station was found to be S 66° W, flow in the Ontario area is generally to the south (Dames & Moore, 1990; French, 1972).

### **1.5.3 Regional Background Data**

The California Regional Water Quality Control Board, Santa Ana Region, has sampled several water supply wells in the Ontario area since 1986 and has found ten wells to be contaminated with chlorinated solvents. These wells are located south and southwest of the Ontario IAP. Two of the solvents in the groundwater samples from the wells were identified as trichloroethene (TCE) and tetrachloroethene (PCE), and were reported at concentrations as high as 146 parts per billion (ppb) and 15 ppb, respectively (Dames & Moore, 1990). Other chlorinated organic compounds were identified in the groundwater at lower concentrations. The 15 ppb PCE concentration was found during 1987 testing of the Judy Mae Well west-southwest of the station (see Figure 1-3).

The California Regional Water Quality Control Board, Santa Ana Region is continuing to investigate the source of the contaminants. Investigation into current and past industrial solvent users in the Ontario IAP area revealed that the General Electric Company, Northrop Aircraft Company, Douglas Aircraft Company, Aerojet General Corporation, and Lockheed Aircraft Services, in addition to the ANG station, use or have used these solvents. All of these facilities have had routine discharges of industrial wastes that may have impacted the groundwater in the area. Soils were found to be contaminated with chlorinated solvents to depths of more than 100 ft at the General Electric Engine Maintenance Center adjacent to the station (Dames & Moore, 1990).

## **2.0 FIELD PROGRAM**

### **2.1 SUMMARY**

This section discusses the site-specific field program conducted at the station during the ESI. ESI activities included field screening and confirmation sampling and testing at Site 1. Field screening activities consisted of a soil gas survey and headspace analysis of soil samples; confirmation activities included laboratory analysis of 21 soil samples from 6 soil borings and 2 rounds of water samples from the 2 groundwater monitoring wells installed. All field activities were performed in accordance with the procedures and methods presented in the approved IRP ESI Work Plan with one exception. The work plan required that the monitoring well screens straddle the water table. However, because of the dual-wall air percussion drilling method used and the low permeability of the fine-grained material encountered at the water table, it was difficult to accurately determine water depth as drilling advanced. As a result, the top of the well screens were installed approximately 2 to 3 ft below the static water levels under the station. Because of the physical and chemical properties of the suspect hazardous materials used at the station, screen placement below the water table will not affect the investigation objective.

### **2.2 GEOLOGIC AND HYDROGEOLOGIC INVESTIGATIONS**

Soil borings and groundwater monitoring wells were drilled to characterize and determine the extent of potential subsurface contamination at Site 1. Soil borings were used to assess the limit or extent of potential surficial soil contamination, and to characterize the geology of the shallow subsurface at Site 1, including depth to the top of the original Cucamonga Creek bed. Discussions on site-specific geology are based on the lithologic description of soils encountered in the soil borings and monitoring wells. Boring logs are provided in Appendix A.

Groundwater monitoring wells placed within the station property boundaries were used to define and characterize the following site-specific conditions:

- Depth to water table
- Presence or absence of groundwater and aquifer contamination
- Lithologic description from the surface to 280 feet bgs.

Groundwater monitoring well MW1 was drilled, installed, and abandoned. This well was replaced with MW3 at the request of the Hazardous Waste Remedial Actions Program (HAZWRAP) Project Manager because MW1 was determined to contain grout originating from a break in the seal above the sand pack. The original background well was abandoned by grouting in accordance with California Department of Water Resources Well Standards. The well casing was cut off approximately 3 ft bgs, filled with concrete grout, and covered with sandy soil.

## **2.3 FIELD SCREENING ACTIVITIES**

Based on the approved ESI Work Plan, the following field screening activities were performed at the station:

- Soil Organic Vapor Survey
- Soil Sample Headspace Screening.

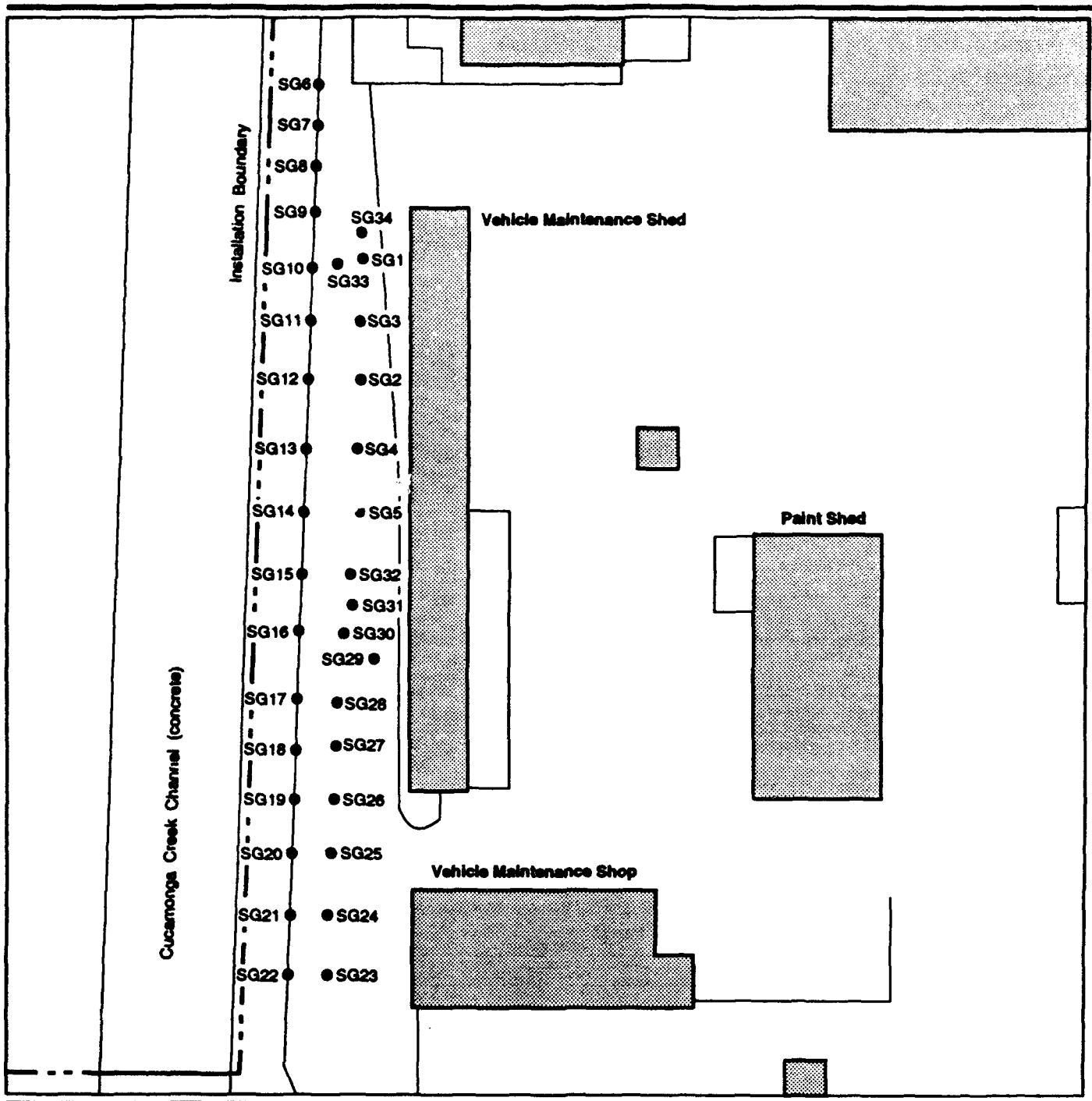
The field screening activities were performed to delineate potential contaminant plume configurations beneath Site 1.

### **2.3.1 Soil Gas Survey**

A soil gas survey was performed June 1 to 4, 1992, to measure organic vapors in the shallow subsurface soil environment. A total of 34 soil probes were driven into the ground, with 30 in two rows spaced approximately 20 ft apart and 4 in additional locations where spills were likely to occur. Figure 2-1 shows the sample probe locations. The probes were driven 4 to 6 ft bgs and pulled up to expose the gas intake tip to the sample depth. A sampling adaptor was placed on top of the probe and connected to a vacuum pump. Soil vapor samples were extracted from the sampling adaptor and injected into an on-site gas chromatograph for analysis (total scan for volatile organic compounds). (For a complete methodology description, see the survey report in Appendix D). Results from soil gas analysis were used to select soil boring locations.

### **2.3.2 Soil Boring and Sampling**

Six soil borings (SB1 through SB6) located within Site 1 were drilled June 15 to 17, 1992, to depths of 36.5 to 39.0 ft bgs. Borings were installed to assess the limit or extent of potential soil



# EXPLANATION

- Soil Gas Sampling Point

## Soil Gas Survey Sampling Points

Ontario ANG Station

Figure 2-1



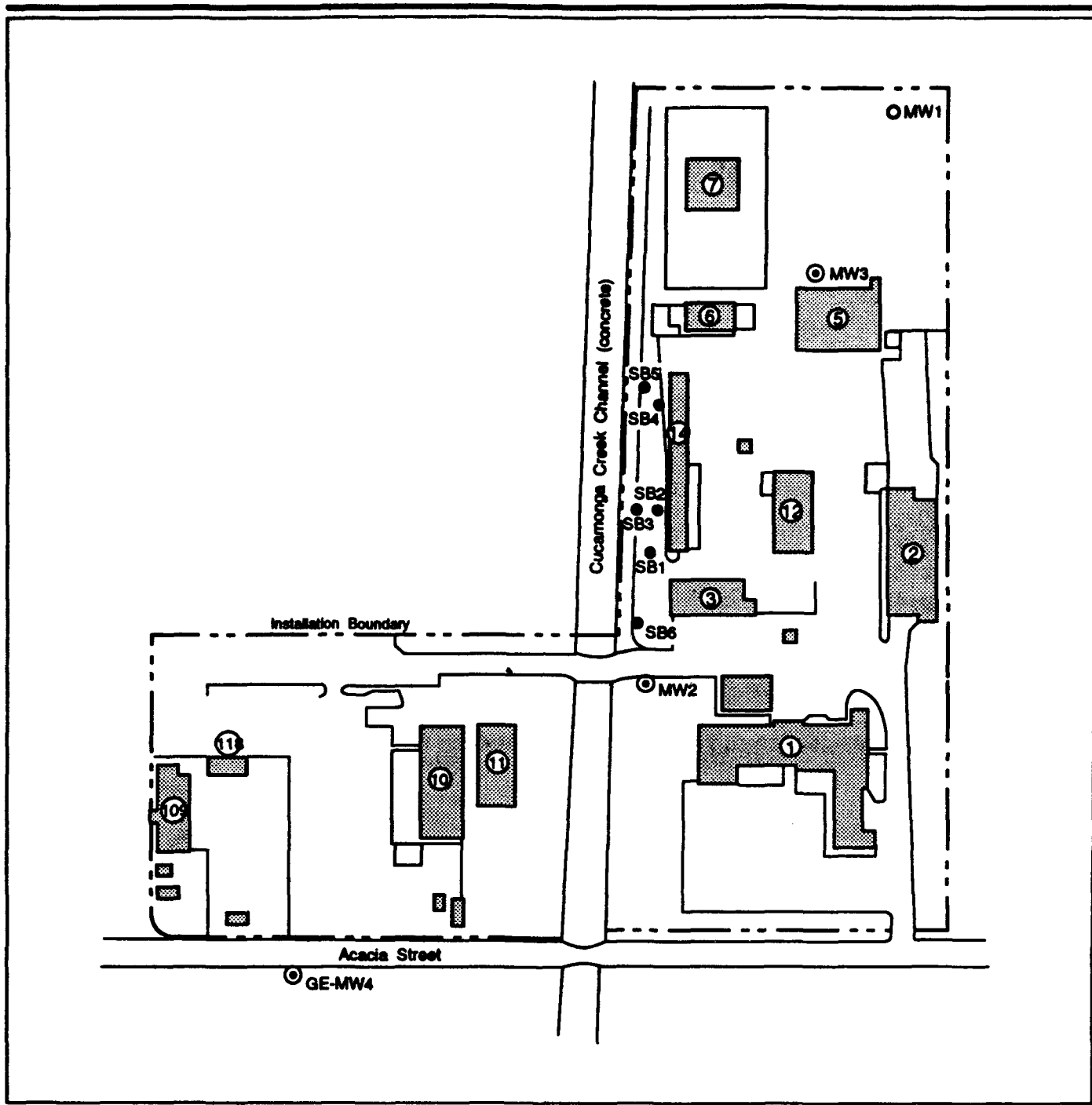
contamination at Site 1. In addition, these soil borings were placed to determine the creek profile of the original Cucamonga Creek channel immediately adjacent to the site. Figure 2-2 shows the soil boring and monitoring well locations.

All soil boring samples were collected through a flight of hollow stem augers using a split-spoon sampler driven in accordance with the American Society for Testing and Materials (ASTM) D-1586. Stainless steel liners were used with the split-spoons for collecting samples; sampling was performed as outlined in HAZWRAP's 1990 Standard Operating Procedure (SOP) #9, section 5.4, for site characterization (Department of Energy [DOE]/HWP-100).

During the drilling process, soil borings SB1 and SB4 through SB6 were sampled from 0.5 to 36.5 ft bgs; SB2 was sampled from 0 to 36.5 ft bgs; and SB3 was sampled from 0 to 39.0 ft bgs. Sampling was not continuous through the soil section; 1- to 2-ft intervals were allowed between sample depths. At each sample depth, a split-spoon sampler with 4-in. stainless steel sleeves was used for sample collection. Each sleeve at least half full of soil was sealed with Teflon and plastic end caps immediately after the sampler was opened. A duplicate sample for headspace analysis was also collected at each depth. Two or three sleeves of soil were generally recovered, although when split-spoon sample recovery was low, one sample sleeve was retained for analysis. A full sleeve from each sample was marked for volatile organic chemical analysis. Intervals where Site 1 samples were collected are shown in Table 2-1 and the soil boring logs are in Appendix A. As can be seen in the table, inconsistency in the depth sampled and the number of samples collected at each boring location resulted from the numerous spoon refusals encountered due to the many cobbles in the fill material.

### **2.3.3 Headspace Analysis**

Headspace analyses were conducted on a total of 80 soil samples collected at Site 1: 15 each from SB1, SB2, and SB5; 14 each from SB4 and SB6; and 7 from SB3. An HNU Systems photoionization detector (PID) was used to screen the various soil headspaces for total volatile organic compounds. The duplicates of the headspace samples with the highest PID readings were sent for laboratory analyses.



#### EXPLANATION

- |                       |                             |
|-----------------------|-----------------------------|
| 1 Administration      | 10 Dining Hall              |
| 2 Supply Building     | 11 Weather Flight           |
| 3 Vehicle Maintenance | 12 Paint Shed               |
| 5 CE Maintenance      | 14 Vehicle Maintenance Shed |
| 6 AGE Maintenance     | 109 State Maintenance       |
| 7 Maintenance Shops   | 118 Storage                 |

- Soil Boring
- ⊙ Monitoring Well
- Abandoned Monitoring Well

#### Soil Boring and Monitoring Well Location Map

Ontario ANG Station

Figure 2-2





**Table 2-1. Soil Borings and Sampling Intervals (in ft bgs) at Site 1  
Ontario ANG Station, Ontario, California**

<b>Interval Number</b>	<b>SB1</b>	<b>SB2</b>	<b>SB3</b>	<b>SB4</b>	<b>SB5</b>	<b>SB6</b>
1	0.5-1.5	0-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5
2	2.5-4.0	2.5-4.0	7.5-9.0	2.5-4.0	2.5-4.0	5-6.5
3	5.5-6.5	5.0-6.5	20-20.5	5.0-6.5	5.0-6.5	7.5-9.0
4	8.5-10.0	7.5-9.0	22-22.5	7.5-9.0	7.5-9.0	10-11.5
5	10.0-11.5	10-11.5	32.5-34.0	10-11.5	10-11.5	12.5-14.0
6	12.5-14	12.5-14.0	35-36.5	12.5-14.0	12.5-14.0	15-16.5
7	15.0-16.5	15-16.5	37.5-39.0	17.5-19.0	15-16.5	17.5-19
8	17.5-19.0	17.5-19.0		20-21.5	17.5-19.0	20-21.5
9	20-21.5	20-21.5		22.5-24.0	20-21.5	22.5-24
10	22.5-24	22.5-24.0		25-26.5	22.5-24	25-26.5
11	25-26.5	25-26.5		27.5-29.0	25-26.5	27.5-29.0
12	27.5-29	27.5-29.0		30-31.5	27.5-29	30-31.5
13	30-31.5	30-31.5		32.5-34.0	30-31.5	32.5-34
14	32.5-34.0	32.5-34		35-36.5	32.5-34	35-36.5
15	35-36.5	35-36.5			35-36.5	

## **2.4 CONFIRMATION ACTIVITIES**

Based on the approved ESI Work Plan, the following field confirmation activities were performed at Site 1:

- Soil boring and sampling
- Groundwater monitoring well installation and sampling.

### **2.4.1 Soil Borings**

Soil boring locations were chosen based on the results of the soil organic vapor survey conducted by Tracer Research Corporation on June 1 to 4, 1992. A total of 21 soil samples, including two replicate samples, were collected for laboratory analysis from six soil borings at Site 1, three per boring from SB1 through SB5, and six from SB6. The selection of confirmatory samples was based on soil headspace results. If no "hits" were recorded during headspace analyses, samples from depths of 10 to 12 ft, 20 to 22 ft, and 35 to 37 ft or from lithologic changes were selected.

Table 2-2 contains the sample number and soil intervals from SB1 through SB6 that were retained for chemical analysis.

### **2.4.2 Monitoring Well Installation**

Two groundwater monitoring wells were installed and sampled to determine the presence or absence of groundwater contamination beneath the station property. The background well, MW3, is located in the northeast corner of the station property. MW2 is located approximately 75 ft south of Site 1 (see Figure 2-2).

The two wells were installed June 18 to July 16, 1992, using a dual-wall air percussion drill rig. During borehole advancement, the drill cuttings were bagged and described at 5-ft intervals from the ground surface to total depth. No soil samples were collected from these monitoring well locations for laboratory analyses. The wells were drilled and installed outside the boundary of Site 1 where potential soil contamination was not expected; however, the drill cuttings were continuously screened for volatile organics using a PID as drilling progressed. Monitoring well boring logs are included in Appendix A.

**Table 2-2. Soil Intervals Retained for Chemical Analysis, Site 1  
Ontario ANG Station, Ontario, California**

<b>Soil Boring</b>	<b>Sample I.D.</b>	<b>Soil Interval (feet below ground surface)</b>	<b>Analysis Requested</b>
SB1	OANG-SB1-09	20-21.5	TCL/TAL; Except PCBs & Pesticides*
	OANG-SB1-11	25-26.5	
	OANG-SB1-15	35-36.5	
SB2	OANG-SB2-05	10-11.5	TCL/TAL; Except PCBs & Pesticides
	OANG-SB2-09	20-21.5	
	OANG-SB2-15	35-36.5	
SB3	OANG-SB3-04	22-23.5	TCL/TAL; Except PCBs & Pesticides
	OANG-SB3-06	35-36.5	
	OANG-SB3-07	37.5-39.0	
SB4	OANG-SB4-05	10-11.5	TCL/TAL; Except PCBs & Pesticides
	OANG-SB4-08	20-21.5	
	OANG-SB4-14	35-36.5	
SB5	OANG-SB5-05	10-11.5	TCL/TAL; Except PCBs & Pesticides
	OANG-SB5-09	20-21.5	
	OANG-SB5-15	35-36.5	
SB6	OANG-SB6-04	10-11.5	TCL/TAL; Except PCBs & Pesticides
	OANG-SB6-07	17.5-19	
	OANG-SB6-12	30-31.5	
	OANG-SB6-14	35-36.5	
	OANG-SB6-15	35-36.5*	
	OANG-SB6-16	30-31.5*	

\* TCL/TAL as required under the March 1990 Contract Laboratory Program Statement of Work, organics revision OL M01.8 and inorganics revision ILMO2.1; for complete list of analytes, see Tables F-1 through F-3.

\*\* Replicate samples

Each monitoring well consisted of a 20-ft, 4-in. diameter, 0.01-in. slotted stainless steel screen with a bottom plug and a 4-1/2-in. diameter schedule 80 polyvinyl chloride (PVC) well casing. The screened interval, as specified in the approved ESI work plan, was intended to extend across the water table, but because it was difficult to determine when water was first encountered during drilling, the screens were determined to be completely submerged after well construction. Stainless steel centralizers were installed at the bottom of each well, at the bottom of the PVC casing, and at 80-ft intervals thereafter. Wells were completed as flush mounts at the request of station personnel. All downhole equipment and well material were decontaminated in accordance with the procedures outlined in the ESI work plan. Well construction details and schematics are included in Appendix B.

#### **2.4.3 Monitoring Well Development, Purging, and Sampling**

After completion, MW2 and MW3 were developed in accordance with HAZWRAP's SOP #4 (Well Development and Purging) for site characterization (DOE/HWP-100). Monitoring wells were developed no sooner than 24 hours after installation. Static water levels and total well depths were measured and recorded before and after the development procedures. Well development consisted of swabbing and water evacuation with a 5-gallon capacity stainless steel bailer and a 4-in. stainless steel pump. Each well was developed until silt free. In addition, field parameters (pH, temperature, and specific conductance) were measured and recorded during well development. Although included in the work plan, dissolved oxygen levels were not measured because the data were not required to meet investigation objectives. Measuring instruments were calibrated prior to use. Parameters were monitored until readings remained stable within  $\pm 10$  percent for three consecutive recording intervals.

On July 24, 1992, and September 10, 1992, groundwater samples were collected from MW2 and MW3 for laboratory analyses. Prior to sample collection, the wells were purged in accordance with HAZWRAP SOP #4. A minimum of three well volumes (approximately 50 gallons) of formation water was removed from each monitoring well using a 5-gallon stainless steel bailer. The wells were sampled within 3 hours of purging using a Teflon bailer. Monitoring well development and purging records are included in Appendix C.

## **2.5 BACKGROUND SAMPLING FOR BASELINE DATA**

Field sampling activities during the station ESI included installing and sampling one background monitoring well (MW3). The location of this well was selected such that water quality data obtained would be free of any influences resulting from past hazardous waste management practices at the station and to determine the quality of the groundwater coming from off site.

## **2.6 DISPOSAL OF WASTES FROM FIELD ACTIVITIES**

Wastes generated during the ESI were handled in a manner that complied with all federal, state, and local regulations. Disposable sampling supplies (e.g., gloves, aluminum foil, and plastic self-locking bags) and disposable personnel outerwear were bagged and/or containerized until the site was determined to be free of contamination, then disposed of as solid waste. Decontamination fluids and development water were collected in U.S. Department of Transportation (DOT)-approved 55-gallon drums and transferred to a 5,000-gallon tank in the station staging area. Purge water was collected in 55-gallon drums and labeled. Soil cuttings from MW1 and MW3 were placed on plastic sheeting and covered with plastic. Only wet cuttings and excess grout were collected in a covered, plastic-lined roll-off bin at MW1 and MW3. To minimize damage to the landscaping at the site of the downgradient well (MW2), however, all cuttings from MW2 were collected in a covered, plastic-lined roll-off bin and moved to the staging area.

Soil cuttings and wastewater generated from this activity were properly containerized and labeled. The chemical analysis for the source areas of the soils and water are nonhazardous as documented in this report. Proper disposal of the investigation-derived wastes will be accomplished.

### **3.0 SIGNIFICANCE OF RESULTS**

The results of the field investigations conducted at Site 1 are described in the following sections. This includes a discussion of the characteristics of the site soils, depth to the original Cucamonga Creek bed, direction of groundwater flow, and surficial soil and aquifer contamination.

#### **3.1 BACKGROUND**

The objective of the ESI at Site 1 was to confirm the presence or absence of contamination that may have resulted from past hazardous waste management activities at the site. To meet this objective, field screening activities (e.g., soil gas survey and soil headspace analysis) and confirmation activities (e.g., soil borings and monitoring well installation) were conducted at Site 1 to generate data for site characterization.

In spring 1992, soil and groundwater samples were collected from Site 1 and analyzed for target analyte list/target compound list (TAL/TCL) constituents (except polychlorinated biphenyls [PCBs] and pesticides). In the process of collecting soil and groundwater samples, site-specific soil characteristics were logged to evaluate the influence of local geology on the release and movement of contaminants, and on the water-bearing units and uppermost aquifer at the station.

#### **3.2 BASE GEOLOGY AND HYDROGEOLOGY**

The surface at Site 1 was filled to its existing elevation when the Cucamonga Creek flood control channel was constructed. Materials below the fill consist of alluvial fan and wash deposits in the area of Site 1 and wind-blown fine- to medium-grained sand in the eastern part of the station. Quaternary alluvium extends to approximately 1,000 feet in the station area. Tertiary marine sedimentary rock may or may not occur between the alluvium and the underlying basement rock.

Groundwater in the uppermost aquifer below the station is unconfined and occurs at approximately 250 ft bgs. Although flow is generally southward toward the basin outlet at Prado Dam, the flow direction at the adjacent General Electric facility was reported to the west-southwest (Dames & Moore, 1990).

### **3.3 DESCRIPTION OF SITE 1**

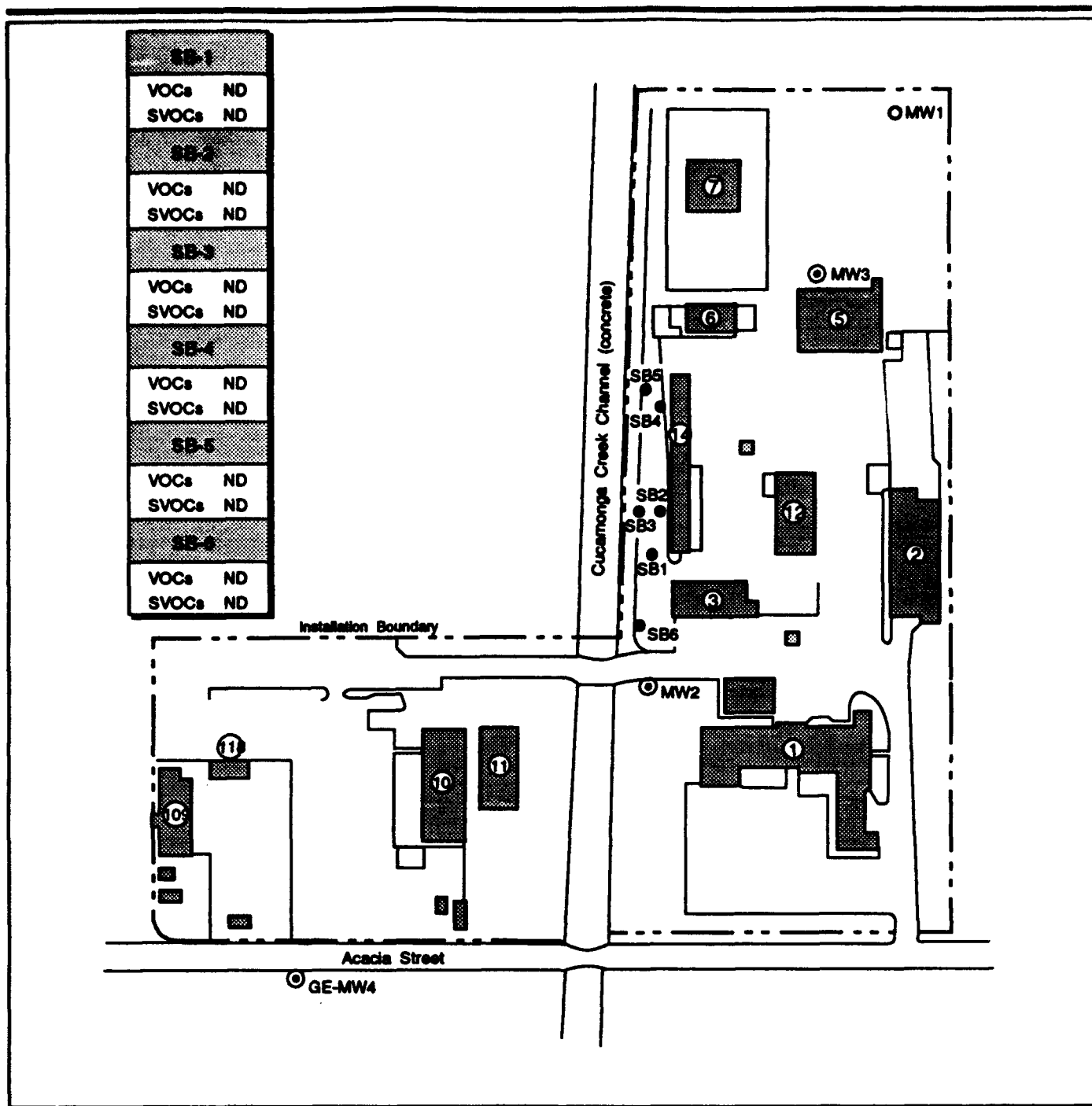
#### **3.3.1 Screening Activity Results**

The results of the soil organic vapor survey are presented in detail in Appendix D. Five of the ten organic analytes included in the survey were found at Site 1. TCA and PCE were detected in almost all of the samples, but at concentrations approximately equal to those found in ambient air control samples. Analytes detected in soil vapor but not in ambient air were TCE, which was found at 0.0007 micrograms per liter ( $\mu\text{g/L}$ ) in SG-19 and SG-20; toluene, which was detected in sample SG-1 at 10  $\mu\text{g/L}$ ; and total volatile hydrocarbon, which was 10  $\mu\text{g/L}$  in the sample containing toluene at the same concentration (SG-1) and less than 1  $\mu\text{g/L}$  in the remainder of the samples.

Headspace organic vapor analysis of the soil samples was performed using an HNU Systems PID, and the results were used to determine which samples would be sent for laboratory analysis. Readings are listed on the soil boring logs in Appendix A. The highest concentration of organic vapor measured was 0.4 parts per million (ppm) above background.

#### **3.3.2 Confirmation and Delineation Activity Results**

Twenty-one soil samples collected from six borings were retained for confirmatory chemical analysis. All the samples were received in good condition by Compuchem Laboratories and were analyzed as requested on the Chain-of-Custody records (Appendix E). A summary of organic analyses for soil samples is shown in Figure 3-1. Detailed laboratory analytical results and data validation records are presented in Appendices F and G. The only organics detected (Table 3-1) were methylene chloride, acetone, bis(2-ethylhexyl)phthalate, and di-n-butylphthalate, which were also detected in associated field and laboratory blanks. Methylene chloride and acetone were detected in almost all of the volatile organic analyte (VOA) analyses. In some samples, the concentration of these analytes was higher than ten times the concentration detected in the associated blank; so according to HAZWRAP protocol there is not a qualifier. Since the blank contamination was so widespread, these contaminants did not originate from the samples. Inorganic analyte results are presented in Appendix F, Table F-3, and a statistical analysis of the results is presented in Table 3-2.



#### EXPLANATION

- |                       |                             |                             |
|-----------------------|-----------------------------|-----------------------------|
| 1 Administration      | 10 Dining Hall              | ● Soil Boring               |
| 2 Supply Building     | 11 Weather Flight           | ⊙ Monitoring Well           |
| 3 Vehicle Maintenance | 12 Paint Shed               | ○ Abandoned Monitoring Well |
| 5 CE Maintenance      | 14 Vehicle Maintenance Shed |                             |
| 6 AGE Maintenance     | 109 State Maintenance       |                             |
| 7 Maintenance Shops   | 118 Storage                 |                             |

#### Summary of Organic Analyses for Soil Samples

Ontario ANG Station

Figure 3-1





**Table 3-1. Organic Analytes (mg/kg) Detected in Soil Samples  
Ontario ANG Station Expanded Site Investigation**

Sample Numbers	Methylene Chloride	Acetone	Di-n- butylphthalate	bis(2- ethylhexyl) phthalate
OANG - SB109	0.019 U	0.320		
OANG - SB109RE	0.110 U	0.280		
OANG - SB111	0.068 U	4.000		
OANG - SB111RE	2.100 U	4.700		
OANG - SB115	0.018 U	0.029 U		
OANG - SB205	0.054 U	1.200		
OANG - SB205RE	2.700 U	2.200 U		
OANG - SB209	0.031 U	0.340		
OANG - SB209RE	0.075 U	0.091 U		
OANG - SB215	0.032 U	0.075 U		
OANG - SB304	.064	5.600		.045 J
OANG - SB304RE	4.100	6.200 U		
OANG - SB306	0.012 U	.094 U		
OANG - SB307	0.013 U	.020 U		
OANG - SB405	0.019 U	3.600		0.920
OANG - SB405RE	4.400	2.500 U		
OANG - SB408	0.023 U	0.050 U		
OANG - SB505	0.030 U	0.038 U		
OANG - SB515	0.070 U	0.059 U		
OANG - SB604	0.066 U	0.110 U		
OANG - SB607	0.065 U	0.025 U	.041 J	.050 J
OANG - SB612	0.030 U	0.029 U		
OANG - SB614	0.048 U	0.030 U		
OANG - SB615	0.073 U	0.097 U		
OANG - SB616	0.028 U	0.034 U		

J Indicates that analyte was present but reported value not accurate or precise.

U Not detected. The associated number indicates approximate sample concentration necessary to be detected.

Methylene chloride and acetone were detected in almost all of the VOA analyses. In some samples, the concentration of these analytes were higher than 10 times the concentration detected in the associated blank; so according to HAZWRAP protocol there is not a qualifier. Since the blank contamination was so widespread, these contaminants did not originate from the samples.

**Table 3-2. Statistical Analysis of Inorganic Analytes in Site 1 Soils  
Ontario ANG Station Expanded Site Investigation**

<b>Analyte</b>	<b>Minimum Concentration (mg/kg)</b>	<b>Maximum Concentration (mg/kg)</b>	<b>Arithmetic Mean (mg/kg)</b>	<b>Geometric Mean (mg/kg)</b>	<b>Background Range (mg/kg)<sup>1</sup></b>
Aluminum	5,630	22,400	11,024	14,015	
Antimony	4.2	5.8	4.6	5.0	2.1 UN - 12.1 UN
Arsenic	0.73	7.2	2.9	4.0	0.2 OU - 1.2 B
Barium	49.1	180.0	98.5	114.6	
Beryllium	0.22	0.76	0.40	0.49	0.16 U - 1.1 B
Cadmium	0.51	0.61	0.55	0.56	0.39 U - 1.1 B
Calcium	2,430	7,560	4,068	4,995	
Chromium	7.2	27.1	15.4	17.2	1.8 - 44.6
Cobalt	4.4	11.5	6.9	8.0	
Copper	5.6	21.0	11.5	13.3	0.85 U - 28.7
Iron	8,940	24,600	14,388	16,770	
Lead	1.6	15.9	4.2	8.8	0.93 - 29.4
Magnesium	2,740	7,920	4,307	5,330	
Manganese	87.8	564	197	326	
Mercury*	0.10	0.10	0.10	0.10	0.08 U - 1.0 U
Nickel	4.0	13.5	7.8	8.8	0.75 U - 23.3
Potassium	940	3,770	2,152	2,355	
Selenium	0.31	3.60	1.2	2.0	0.16 U - 1.0 U
Silver	1.0	1.2	1.1	1.1	0.59 U - 1.4 U
Sodium	149	291	215	220	
Thallium	0.20	0.24	0.22	0.22	0.14 U - 1.0 U
Vanadium	18.7	58.0	34.7	38.4	
Zinc	24.7	69.2	41.0	47.0	10.2 - 79.7
Cyanide*	0.51	0.51	0.51	0.51	

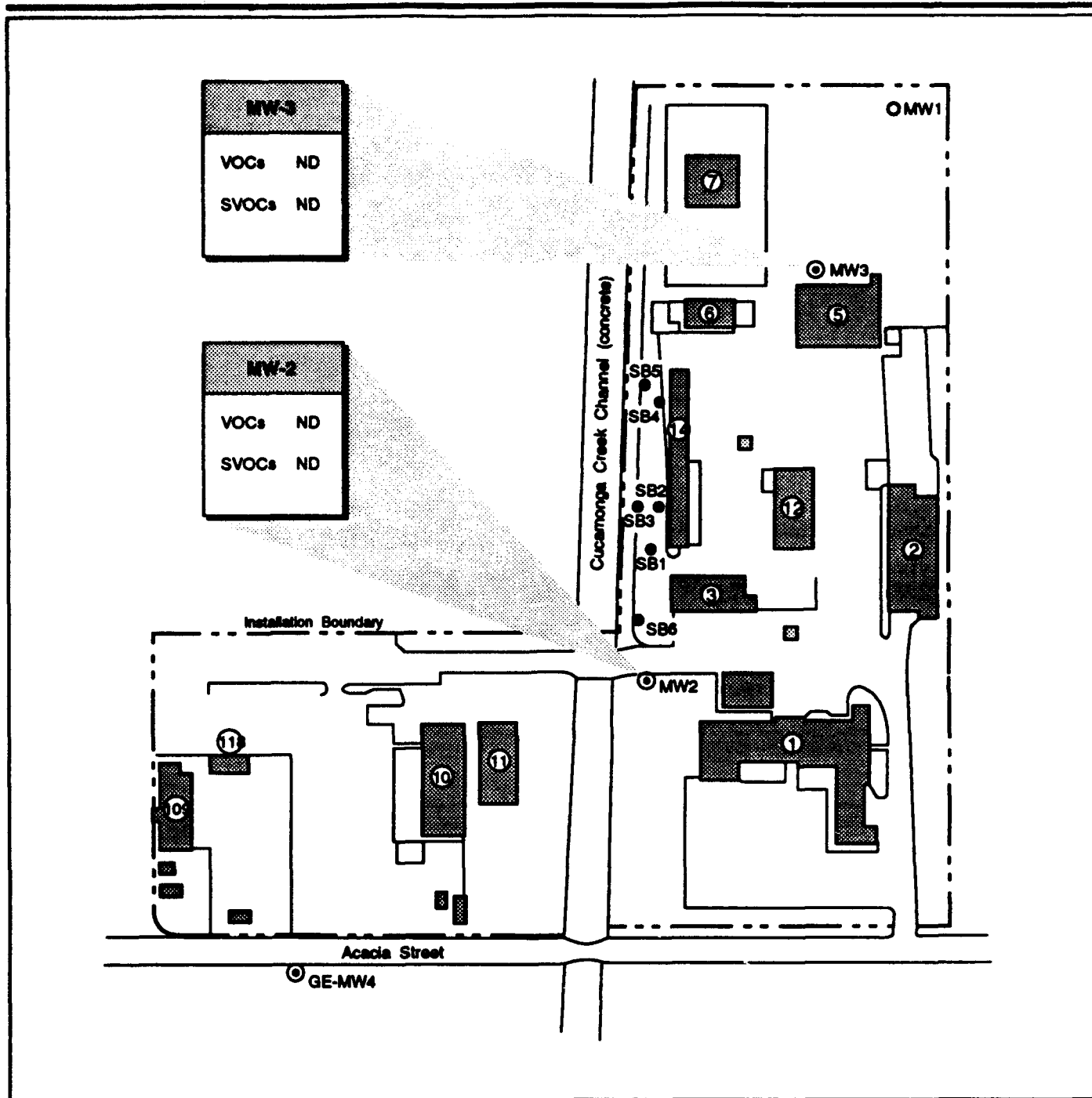
\* Samples did not contain detectable levels of analyte. Contract-required detection limit was used in statistical analysis.

<sup>1</sup> Range of background concentrations in subsurface soils at Norton AFB which is located approximately 25 miles east of Ontario ANG Station. Source: CDM Federal Programs, 1992.

B Reported value was obtained from a reading that was less than the contract-required detection limit but greater than or equal to the instrument detection limit.

N Spiked sample recovery not within control limits.

U Analyte was analyzed for, but not detected.



#### EXPLANATION

- |                       |                             |                             |
|-----------------------|-----------------------------|-----------------------------|
| 1 Administration      | 10 Dining Hall              | ● Soil Boring               |
| 2 Supply Building     | 11 Weather Flight           | ⊙ Monitoring Well           |
| 3 Vehicle Maintenance | 12 Paint Shed               | ○ Abandoned Monitoring Well |
| 5 CE Maintenance      | 14 Vehicle Maintenance Shed |                             |
| 6 AGE Maintenance     | 109 State Maintenance       |                             |
| 7 Maintenance Shops   | 118 Storage                 |                             |

#### Summary of Organic Analyses for Water Samples

Ontario ANG Station

Figure 3-2



Two rounds of water samples were collected. A summary of organic analyses for water samples is shown in Figure 3-2. The well located downgradient of and adjacent to Site 1 (MW2) contained no quantifiable concentrations of any volatile or semivolatile organic analytes (Table 3-3) with the exception of methylene chloride and bis(2-ethylhexyl)phthalate, which were also detected in associated field and laboratory blanks. Both analytes were found at a concentrations below the contract-required quantification limit (CRQL). Inorganic results are shown in Table 3-4. Detailed laboratory analytical results are presented in tables F-4 and F-5 of Appendix F, and data validation reports are presented in Appendix G.

Inorganic analytes detected above contract-required detection limits (CRDLs) in filtered water samples were aluminum (which was also detected in the associated blank), calcium, magnesium, manganese, sodium, and zinc. Unfiltered samples also contained chromium and lead above CRDLs. Inorganic analyte concentrations were approximately equal to concentrations in background well MW3 (see Table 3-4). Selenium was not detected in the water samples, but the analytical results were considered unreliable because the analyte was also not detected in the associated spiked sample.

### **3.3.3 Geologic and Hydrogeologic Investigation Results**

The lithologies encountered in the soil borings and monitoring wells drilled at the station during the ESI were described by an experienced geologist (see boring logs in Appendix A). The soils primarily consist of poorly graded sands (SP) and silty gravels (GM), interbedded with fine- to coarse-grained sands (SM/SC). The sands vary from relatively coarse to silty and slightly clayey; the silts and silty sands occur in distinct layers that were continuous across the site. The soil types encountered are typical of alluvial deposits. Figure 3-3 represents a southwest to northeast cross-section of the subsurface at the station.

Soil boring descriptions from Site 1 show that the original Cucamonga Creek bed was approximately 18 to 25 ft below the present ground surface. Figure 3-4 shows an interpreted geologic section across Site 1 from east to west. Miscellaneous material consisting of gravels, cobbles, and silty sands comprised the fill. Numerous auger refusals and/or poor split-spoon recovery occurred during soil boring activities at Site 1 because of the presence of the gravels and cobbles within the miscellaneous fill.

**Table 3-3. Organic Analytes Detected in Water Samples (µg/L)**

	OANG MW201	OANG MW301	OANG MW302	OANG MW202	OANG MW303	MCL
Methylene Chloride	2B	1B	2B		1J	NR
Acetone		7J	7J			NR
Tetrachloroethene		2J	2J		2J	5
Phenol		1B	6B			NR
Dimethylphthalate			2J			NR
Diethylphthalate			2J			NR
Di-n-butylphthalate			2J			NR
bis(2-Ethylhexyl)phthalate		2B	8B		4B	4
N-Nitrosodiphenylamine				1J		NR

- B** - Not detected substantially above level reported in laboratory or field blanks  
**J** - Analyte present. Reported value may not be accurate or precise or may be estimated because of the presence of interference  
**MW201** - Monitoring Well Number 2, 1st Sample.  
**NR** - Not Regulated.

**Table 3-4. Inorganic Analytes Detected in Water Samples**  
**Page 1 of 2**  
**(Unfiltered Samples)**

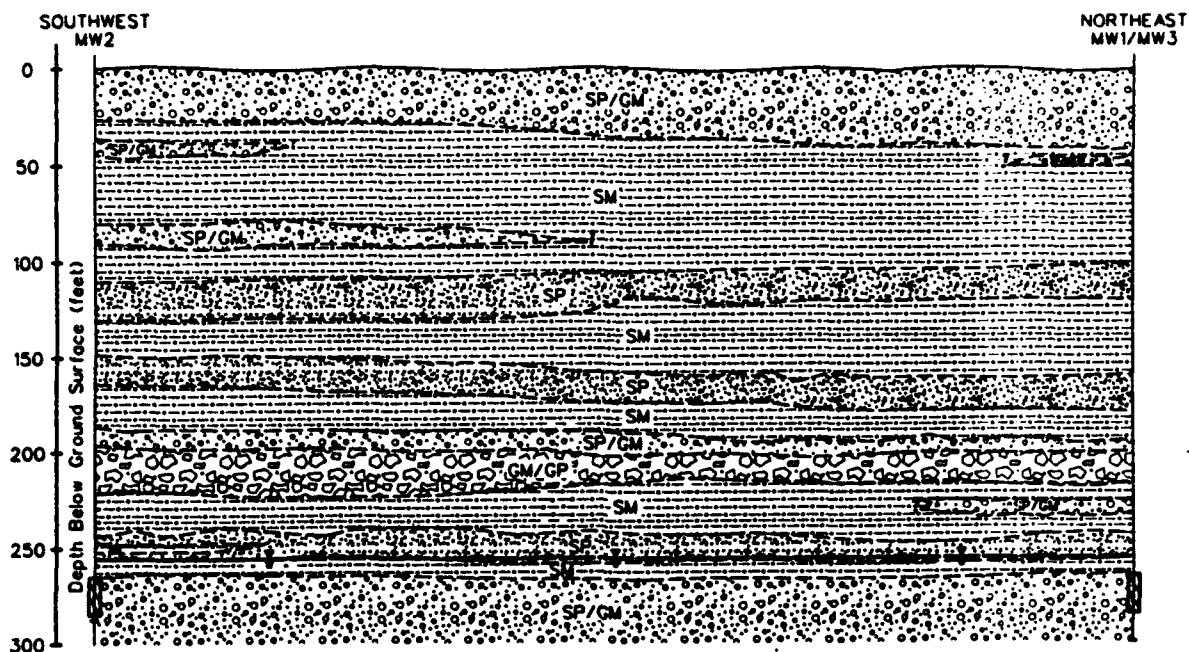
	MW2 01 7-24-92	MW3 01 7-24-92	MW3 02 7-24-92	MW2 02 9-10-92	MW3 03 9-10-92
Analyte	Analyte Concentrations Detected (µg/L)				
Aluminum	1,060	5,370	4,380	4,950R	13,400
Antimony					8.4UJ
Arsenic				4.7J	
Barium	43.6UJ	75.4UJ	64.1UJ	83.6	122B
Calcium	46,700	46,700	43,100	47,800	49,100
Chromium	9.1UJ	13.8	9.8UJ	17.5	23.5
Copper	19.5UJ	25.3	20.9UJ	6.2J	13.7B
Iron	1,240	6,350	4,890	4,210	12,800
Lead				3.3	6.4
Magnesium	10,000	11,800	10,700	11,100	13,400
Manganese	44.4	204	173	98.6	218
Potassium	3,440UJ	4,260UJ	3,400UJ	2,440J	4,110UJ
Sodium	17,300J	17,700J	16,100J	16,300	16,800
Vanadium	14.9UJ	22.6UJ	18.4UJ	20.0	38.8UJ
Zinc	523	269	248	109J	125J

- B - Not detected substantially above level reported in laboratory or field blanks  
J - Analyte present. Reported value may not be accurate or precise or may be estimated because of the presence of interference  
R - Unreliable results. Analyte may or may not be present in sample  
UJ - The reported value was obtained from a reading that was less than the CRDL but greater than or equal to the Instrument Detection Limit  
MW 201 - Monitoring Well Number 2, 1st Sample

**Table 3-4. Inorganic Analytes Detected in Water Samples**  
**Page 2 of 2**  
**(Filtered Samples)**

	<b>MW2 01 7-24-92</b>	<b>MW3 01 7-24-92</b>	<b>MW3 02 7-24-92</b>	<b>MW2 02 9-10-92</b>	<b>MW3 03 9-10-92</b>
<b>Analyte</b>	<b>Analyte Concentrations Detected (µg/L)</b>				
<b>Aluminum</b>	56.5J	54.0J	56.3	117J	345B
<b>Arsenic</b>				4.5J	
<b>Barium</b>	17.6UJ	33.1UJ	31.8UJ	47.2	43.3J
<b>Calcium</b>	44,400	47,200	45,500	47,500	50,400
<b>Chromium</b>			6.2UJ	7.2J	7.6J
<b>Copper</b>	7.9UJ	5.3UJ	6.8UJ	7.9J	5.6J
<b>Iron</b>					282B
<b>Lead</b>					
<b>Magnesium</b>	9,550	10,700	10,300	10,100	11,000
<b>Manganese</b>	23.3	111	106	14.2	58.8
<b>Potassium</b>	2,910UJ	2,680UJ	2,930UJ	1,720J	1,760J
<b>Sodium</b>	16,800	17,900	17,200J	16,900	17,400
<b>Vanadium</b>	13.3UJ	8.8UJ	9.5UJ	11.1	10.0J
<b>Zinc</b>	150	55.4	51.4	42.4	42.1

- B** - Not detected substantially above level reported in laboratory or field blanks  
**J** - Analyte present. Reported value may not be accurate or precise or may be estimated because of the presence of interference  
**R** - Unreliable results. Analyte may or may not be present in sample  
**UJ** - The reported value was obtained from a reading that was less than the CRDL but greater than or equal to the Instrument Detection Limit  
**MW 201** - Monitoring Well Number 2, 1st Sample



#### EXPLANATION



GM/GP Poorly Graded Gravels  
with Little or No Fines



SP/GM Sands and Gravels



SM Silty Sand



SP Poorly Graded Sand



Potentiometric Surface



MW Monitoring Well

SI Screen Interval

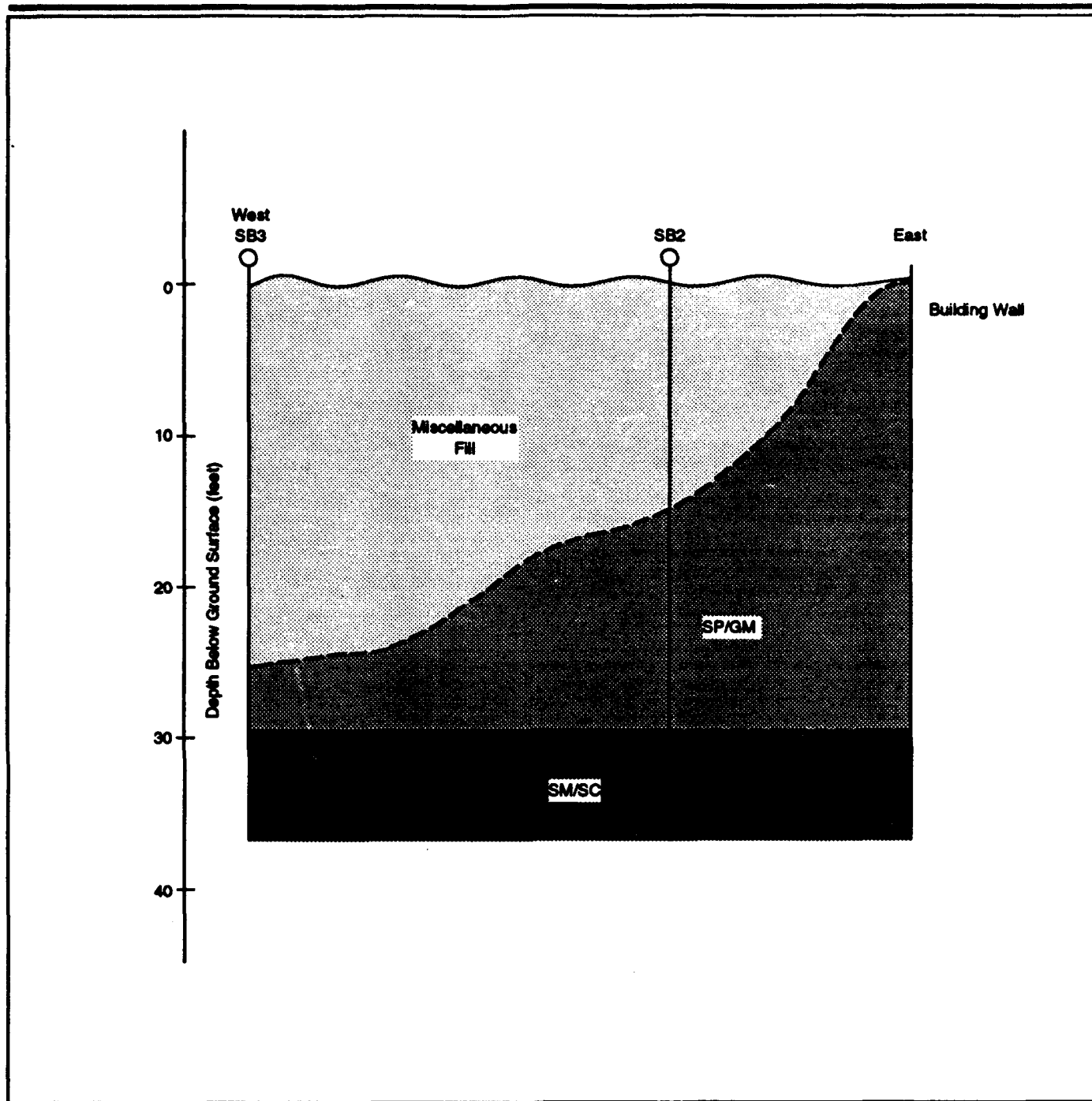


#### Generalized Geologic Cross Section, Southwest to Northeast




Ontario ANG Station

Figure 3-3

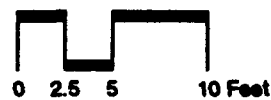




#### EXPLANATION

-  Miscellaneous Fill
-  SP/GM Sands and Gravels
-  SM/SC Silty Sands and Clayey Sands

 Soil Boring



#### Generalized Geologic Cross Section, Site 1 West to East

Ontario ANG Station

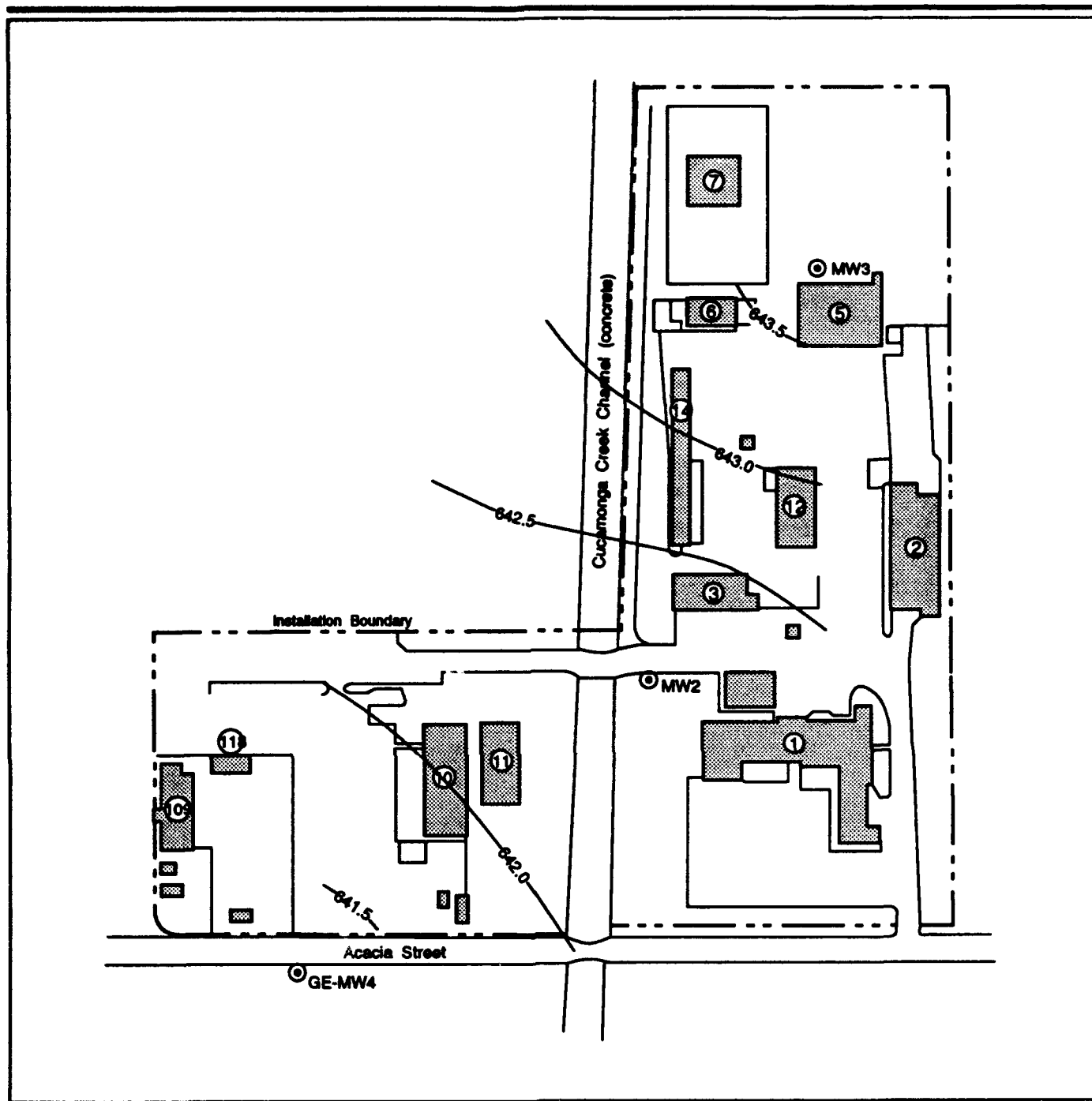
Figure 3-4

The lithologic characteristics of the soils found 25 to 30 ft bgs at Site 1 are consistent with those in the monitoring well borings: mostly medium- to coarse-grained sands mixed with gravels (SP/GM) at 25 ft bgs, changing to silty sands, mixed with small amounts of clay (SM/SC) at 30 to 35 ft bgs. As Figure 3-3 shows, these two lithologic units generally represent distinct layers correlatable across the station. A very dry and distinct 10- to 20-foot-thick gravel layer was encountered at approximately 195 ft bgs in the monitoring well borings. From approximately 215 ft bgs to the water table, fine-grained layers had a high moisture content and coarser material had a moderate moisture content. The interbedded layers of gravelly sands/gravel-sand-silt mixtures and silty sands/sand clay mixtures will inhibit or retard the downward percolation of fluids to the water table beneath the station.

Static water levels measured in the monitoring wells on July 21, 1992, are shown in Table 3-2. Only one round of water level measurements was made because of limited access to a third well. The third well measured, GE-MW4, is located on the adjacent General Electric facility approximately 439.0 ft west and 325.2 ft south of MW2. Based on these data, groundwater at the station is approximately 250 ft bgs and flows towards the south-southwest (S 11° W) with a gradient of 0.002 ft/ft; Figure 3-5 shows water level contours. Data from the General Electric facility adjacent to the station showed hydraulic conductivity values that ranged from  $2.13 \times 10^{-3}$  to  $4.83 \times 10^{-6}$  centimeters per second (cm/sec) (Dames & Moore, 1990).

### 3.4 BACKGROUND SAMPLING RESULTS

No background soil samples were analyzed. Background groundwater conditions were investigated by installation of and two rounds of sampling at well MW3 in the northeastern corner of the station. VOAs detected were methylene chloride and acetone, which were also detected in associated field and laboratory blanks, and 2 µg/L PCE. Although PCE was not detected in the well downgradient of Site 1, it was detected in all three samples (including a duplicate) taken from the background well. The concentrations of PCE detected were below the CRQL limit but above the quantification limit of the instrument used. The results were therefore flagged to indicate that the reported value is not accurate or precise (see Appendix G). However, the results were comparable to the 1.6 µg/L concentration reported in the split sample taken by the California Regional Water Quality Control Board representative during the first round of sampling. The concentration was below the federal and state primary drinking water standards maximum contaminant level of 5 µg/L.



# EXPLANATION

- |                       |                             |
|-----------------------|-----------------------------|
| 1 Administration      | 10 Dining Hall              |
| 2 Supply Building     | 11 Weather Flight           |
| 3 Vehicle Maintenance | 12 Paint Shed               |
| 5 CE Maintenance      | 14 Vehicle Maintenance Shed |
| 6 AGE Maintenance     | 109 State Maintenance       |
| 7 Maintenance Shops   | 118 Storage                 |

 Monitoring Well  
 Water Level Contour

**Groundwater Level  
Contours  
21 July 1992**

**Ontario ANG Station**

**Figure 3-5**





Semivolatile analytes detected at low concentrations in water samples were dimethylphthalate, diethylphthalate, di-n-butylphthalate, bis(2-ethylhexyl)phthalate, and phenol, which were also detected in the associated field and laboratory blanks. No analytes were detected above the CRQLs. Inorganic analyte concentrations were comparable to those detected in the downgradient well MW2. Detailed laboratory report tables and data validation reports are presented in Appendices F and G.

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## **4.0 SUMMARY AND CONCLUSIONS**

### **4.1 SUMMARY**

The ESI conducted June 1 to September 10, 1992, by The Earth Technology Corporation consisted of a soil organic vapor survey followed by the installation and sampling of six soil borings using hollow-stem augers and two monitoring wells using a dual-wall air percussion drill rig. Soil and water sampling objectives were to confirm the presence or absence of contamination at Site 1 and in groundwater entering the installation from the northeast. The borings were also used to characterize the geology of the shallow subsurface.

The soil gas survey performed by Tracer Research Corporation June 1 to 4, 1992 consisted of sampling and analysis of soil vapor from 34 locations using probes driven approximately 5 ft into the ground. Five of the ten target analytes were detected at Site 1. TCA and PCE were detected in nearly all of the samples but were detected at approximately equal concentrations in ambient air control samples. TCE was detected at 0.0007  $\mu\text{g/L}$  in two samples, and toluene and total volatile hydrocarbons (TVHC) were detected at 10  $\mu\text{g/L}$  in one sample.

The original creek bank where hazardous materials could have been spilled or disposed of was interpreted to have been gently sloping, with the interface between natural material and fill identified at approximately 18 to 25 ft below the present land surface in soil borings. Vadose zone soils underlying the fill were found to consist of alternating coarse- and fine-grained layers, which would tend to retard the percolation of fluids to the water table. Groundwater under the station was approximately 250 ft bgs with a gradient of 0.002 ft/ft S 11° W.

No organic vapor levels exceeding 0.4 ppm over background were detected during headspace screening of soil samples. No organic analytes were detected in soil samples other than methylene chloride, acetone, and phthalates, which were also detected in associated field and laboratory blanks. Organic analytes detected in water samples from the downgradient monitoring well were limited to methylene chloride and a phthalate, which were also detected in associated field and laboratory blanks. The background well, however, contained 2  $\mu\text{g/L}$  of PCE during both sampling rounds.

## **4.2 CONCLUSIONS**

The ESI results show no contamination of soil or groundwater at Site 1 and PCE contamination at less than the drinking water standard maximum contaminant level in groundwater upgradient of the site. Therefore, Site 1 is not considered a probable source of contaminants contributing to the regional groundwater contamination problem. As there were no contaminants with levels of concern, there is no need for a preliminary risk evaluation.

### **4.2.1 Data Limitations**

Evaluation of the significance of inorganic analytical results for soil samples was not possible because comparable background levels were not available.

### **4.2.2 Recommendations for Future Work**

No further action is recommended at Site 1.

### **4.2.3 Decision Documents**

A No Further Action Decision Document should be developed for Site 1.

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**APPENDIX A**  
**SOIL BORING AND MONITORING WELL LOGS**

# Borehole Log

Project Name: <u>Ontario Air National Guard Station ES1</u>		Project Number: <u>92890501</u>	
Borehole Location: <u>Site 1</u>		Borehole No. <u>SB1</u>	Sheet 1 of 2
Drilling Agency: <u>Beylik Drilling, Inc</u>		Driller: <u>Gene Gular</u>	
Drilling Equipment: <u>B-61 Mobile Rig</u>		Date Started: <u>6/15/92</u>	Total Depth (feet): <u>36.5</u>
Drilling Method: <u>Helium stem / split spec. sampling</u>		Date Finished: <u>6/15/92</u>	Depth to Bedrock (feet): <u>N/A</u>
Drilling Fluid: <u>None</u>		Number of 15 Minute Samples: <u>3 chem. analy.</u>	Depth to Water (feet): <u>N/A</u>
Completion Information: <u>Borehole grouted</u> <u>Soil Boring - upon completion</u>		Borehole Diameter (in): <u>6</u>	Elevation <u>GS</u> and Datum: <u>894.34</u>
		Logged by: <u>F. N</u>	<u>Felix Nehako</u>
		Checked by: <u>J. Jank</u>	Date: <u>7-3-92</u>

Depth (feet)	Sample				Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic		
5	1	0.5-1.5	25 15	80%	1015	N/A	0/0		SP	Brown to yellowish brown poorly graded sands, mixed with gravels 10 YR 5/3 to 5/4
	2	2.0-4	18 67 62	80%	1025	N/A	0/0		SP	" "
	3	5.5-6.5	-	70%	1100	N/A	0/0		SP	" "
10	4	8.5-10	17 68 76	40%	1115	N/A	0/0		SP	" "
	5	10-11.5	27 38 47	75%	1130	N/A	0/0		SM	Brown to yellowish brown medium to coarse grained sands with fewer pebbles/g. 10 YR 5/3 5/4
	6	12.5-14	22 27 40		1135	N/A	0/0		SM	Dark yellowish brown silty sands - well graded 10 YR 4/4 to 4/6
15	7	15-16.5	14 20 23		1142	N/A	0/0		SM/SC	Dark yellowish brown silty clayey sands; low plasticity 10 YR 4/4
	8	17.5-19	19 24 29		1158	N/A	0.3/0.2		SP	Pale brown, poorly graded medium to coarse grained sands mixed with gravels/pebbles 10 YR 6/3
20	9	20-21.5	26 24 34		1206	N/A	0.3/0.2		SP	Pale brown to brownish yellow gravelly sands. More gravels present at this interval 10 YR 6/3 -
	10	22.5-24	34 36 49		1212	N/A	0.4/0.2		SP	Brownish yellow, poorly graded sands - resemble stream deposits 10 YR 6/6
25	11	25-26.5	50 50 75		1218	N/A	0.3/0.2		SP	Pale brown to brownish yellow poorly graded sands with some gravels 10 YR 6/3
30	12	27.5-29	60 72 86		1227	N/A	0.4/0.2		SP/GM	Poorly graded sands - mixed with gravels and silts 10 YR 6/3

Key

\* S/B = Sample reading / background reading;

NA = not analyzed N/A = Not Applicable

Form F-1009  
9-1-91

A-1

# Borehole Log

(Continuation Sheet)

Project Name: <i>Ontario Air National Guard Station ESI</i>		Project Number: <i>42890501</i>	Sheet <i>2</i> of <i>2</i>
Borehole Location: <i>Site 1</i>		Borehole Number: <i>SB1</i>	Logged by: <i>F.N</i>
			Date: <i>6/15/92</i>

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B		
<i>Sample for Chem. Analysis</i>									
<i>33</i>	<i>13</i>	<i>30-31.5</i>	<i>25-64</i>	<i>40%</i>	<i>1235</i>	<i>N/A</i>	<i>0.4/0.2</i>	<i>SM</i>	<i>Dark brown to strong brown fine to coarse grained silty sands. 7.5 YR 4/4 - 4/6</i>
<i>34</i>	<i>14</i>	<i>32.5-34</i>	<i>20-36</i>	<i>46%</i>	<i>1240</i>	<i>N/A</i>	<i>0.3/0.2</i>	<i>SC</i>	<i>yellowish brown, clayey sands. 10 YR 5/6</i>
<i>35</i>	<i>15</i>	<i>35-36.5</i>	<i>35-44</i>	<i>85%</i>	<i>1245</i>	<i>N/A</i>	<i>0.4/0.2</i>	<i>SC/SM</i>	<i>Brown to olive brown fine grained silty, clayey sands. con plasticity No pebbles/gravels. 2.5 Y 4/4</i>
<i>40</i>									
<i>45</i>									
<i>50</i>									
<i>55</i>									
<i>60</i>									
<i>65</i>									
<i>70</i>									
<i>75</i>									
<i>80</i>									
<i>85</i>									
<i>90</i>									
<i>95</i>									
<i>100</i>									

*T.D @ 36.5'*

\* S/B = Sample reading / background reading; NA = not analyzed  
A-2

# Borehole Log

Project Name: <i>Ontario Air National Guard Station ESI</i>						Project Number: <i>42890501</i>	
Borehole Location: <i>Site 1</i>						Borehole No. <i>SB 2</i>	
Drilling Agency: <i>Beylik Drilling Inc.</i>						Driller: <i>Gene Gular</i>	
Drilling Equipment: <i>B-61 Mobile Rig</i>						Date Started: <i>6/15/92</i>	Total Depth (feet): <i>36.5</i>
Drilling Method: <i>Miller stem/split spec. sampling</i>						Date Finished: <i>6/15/92</i>	Depth to Bedrock (feet): <i>N/A</i>
Drilling Fluid: <i>None</i>						Number of 15 Headpace Samples: <i>3 chem. Analys.</i>	Depth to Water (feet): <i>N/A</i>
Completion Information: <i>Soil boring - borehole grouted upon completion</i>						Borehole Diameter (in): <i>6</i>	Elevation and Datum: <i>894.46 AS</i>
						Logged by: <i>FA</i>	<i>Felix Nchako</i>
						Checked by: <i>J. Lark</i>	Date: <i>7-3-92</i>

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic
1	0-1.5	15-27	22	66%	1510	N/A	0.2/0.2	SP/GM	Brownish yellow poorly graded sands mixed with gravels/pebbles	Miscellaneous fill 10 YR 6/6
2	2.5-4	10-12	14	85%	1515	N/A	0.3/0.2	SM	Dark brown to dark yellowish brown silty sands with very few pebbles	10 YR 3/3 to 3/4
3	5-6.5	10-12	26	85%	1520	N/A	0.3/0.2	SM/SC	Dark-brown to yellowish brown silty sands with clays, slightly plastic	10 YR 3/3 to 3/4
4	7.5-9	12-20	21	70%	1525	N/A	0.2/0.2	SP	Gravelly sands, brown to yellowish brown in color	10 YR 5/3
5	10-11.5	12-30	44	30%	1535	N/A	0.2/0.2	SP	"	"
6	12.5-14	24-23	15	70%	1539	N/A	0.3/0.2	SP	Pale brown to light brownish gray gravelly sands	10 YR 6/2
7	15-16.5	24-32	43	80%	1545	N/A	0.2/0.2	SC/SM	Brown silty, clayey sands with moderate plasticity	10 YR 5/3
8	17.5-19	30-30	30	70%	1555	N/A	0.4/0.2	SM/SC	Medium to fine grained silty sands, some clays. Minor amounts of gravels	Yellowish brown 10 YR 5/4
9	20-21.5	16-20	20	75%	1603	N/A	0.6/0.2	SM/SC	"	"
10	22.5-24	22-40	40	70%	1610	N/A	0.6/0.2	SP/GM	Silty sands with gravel pebble mixtures	Looks like Miscellaneous fill material contained in deposits are mica flakes, magnetite + pyrite flakes
11	25-26.5	30-60	80	25%	1615	N/A	0.3/0.2	"	"	"
12	27.5-29	30-42	42	70%	1620	N/A	0.3/0.2	"	"	"

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

Form E-1009 9/1/91

# Borehole Log

(Continuation Sheet)

Project Name: <b>Ontario ANG ES1</b>						Project Number: <b>92890501</b>		Sheet <b>2</b> of <b>2</b>	
Borehole Location: <b>Site 1</b>						Borehole Number: <b>SB2</b>		Logged by: <b>F.N</b>	
								Date: <b>6/15/92</b>	

Depth (feet)	Sample		Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B			PID (ppm) S/B	Graphic
13	30	2	40	16%	N/A	0.2/0.2		SP	Airly graded medium to coarse grained sand, yellowish brown 10 YR 5/4	
14	32.5	25	32	40%	1640	N/A	0.4/0.2	SM/SC	Fine to medium grained silty, clayey sands with moderate plasticity	light yellowish brown 10 YR 6/4
15	35	32	41	50%	1650	N/A	0.2/0.2	SM/SC	"	"
36.5									T.D. @ 36.5'	

\* S/B = Sample reading / background reading; NA = not analyzed

# Borehole Log

Project Name: <i>Ontario Air National Guard Station ES1</i>										Project Number: <i>92890501</i>	
Borehole Location: <i>Site 1</i>						Borehole No. <i>SB3</i>			Sheet 1 of 2		
Drilling Agency: <i>Beylik Drilling Inc.</i>						Driller: <i>Genx Guler</i>					
Drilling Equipment: <i>B-61 Mobile Rig</i>						Date Started: <i>6/16/92</i>		Total Depth (feet): <i>34.0</i>			
Drilling Method: <i>Helium stem/split spoon sampling</i>						Date Finished: <i>6/16/92</i>		Depth to Bedrock (feet): <i>N/A</i>			
Drilling Fluid: <i>None</i>						Number of 7 foot space Samples: <i>3 Chem Analys</i>		Depth to Water (feet): <i>N/A</i>			
Completion Information: <i>Borehole grouted Soil boring - upon completion</i>						Borehole Diameter (in): <i>6</i>		Elevation <i>894.31</i> and Datum: <i>GS</i>			
						Logged by: <i>F.N</i>		Felix Nchako			
						Checked by: <i>J. Jack</i>		Date: <i>7-3-92</i>			

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic
0-1.5	1	0.5-1.5	61	50%	1025	N/A	0.4/0.4	SM/SP	yellowish brown fine to medium grained sands, mixed with silts + gravels/pebbles. low plasticity	10 YR 6/6
Refusal encountered at 3.5' BGS. Borehole advanced to 5' BGS.										
5-7.5	2	5-7.5	36	40%	1025	N/A	0.4/0.4	SM/SP	yellowish brown fine to medium grained silty sands / pebbles + gravels	10 YR 6/6
Refusal encountered at 10' BGS. Borehole advanced to 12.5' BGS										
10-15	No sample was retained in spoon. Blow counts were: 90, 59, 68									Borehole advanced to 15' BGS
15-20	No sample was retained in spoon. Blow counts were: 84 + 85									Borehole advanced to 17.5' BGS
20-25	No sample was retained in spoon. Blow counts were: 18, 26 + 33									Borehole advanced to 22.5' BGS
20-22.5	3	20-22.5	41	25%	1150	N/A	-	SM/SC	fine to medium grained silty, clayey sands.	10 YR 7/3
22.5-32.5	4	22-22.5	150	25%	1200	N/A	0.4/0.4	GM/SP	Gravelly sands, silts, changing to poorly graded sands with pebbles/gravels	slough (perhaps)
More refusal at 25' BGS and therefore borehole was advanced to 32.5' BGS.										

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

Form E-009  
9/1/91

# Borehole Log

(Continuation Sheet)

Project Name: <u>Ontario Air National Guard</u> <u>Station ESI</u>		Project Number: <u>42840501</u>		Sheet <u>2</u> of <u>2</u>	
Borehole Location: <u>Site 1</u>		Borehole Number: <u>SB 3</u>		Logged by: <u>FJ</u>	
				Date: <u>6/16/92</u>	

Depth (feet)	Sample		Field Analysis		LOG		Lithologic Description	Remarks	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B			PID (ppm) S/B
2.5	32.5	17	100%	1230	N/A	0.4/0.4	SM/SC	Nature soil; fine to coarse grained silty clayey sand; low plasticity to med. plasticity 10 YR 4/4	Moderate moisture content
3.5	35-36.5	16-20	45%	1240	N/A	0.4/0.4	SC/SM	silty clayey sands with low to moderate plasticity	Moderate moisture content 10 YR 4/4
4.0	37.5-39	26-30	45%	1250	N/A	0.4/0.4	SC/SM	silty clayey sands with low to moderate plasticity	Moderate to high moisture content 10 YR 4/4
<p><u>T.D. (8) 39.0'</u></p>									

\* S/B = Sample reading / background reading; NA = not analyzed

Form F-1008A  
9/1/91



# Borehole Log

Project Name: <i>Ontario Air National Guard Station ES1</i>						Project Number: <i>928905C1</i>			
Borehole Location: <i>Site 1</i>						Borehole No. <i>SB4</i>		Sheet 1 of 2	
Drilling Agency: <i>Baylik Drilling, Inc.</i>						Driller: <i>Gene Golar</i>			
Drilling Equipment: <i>B-61 Mobile Rig</i>						Date Started: <i>6/16/92</i>		Total Depth (feet): <i>36.5</i>	
Drilling Method: <i>Hollow stem/split spoon sampling</i>						Date Finished: <i>6/16/92</i>		Depth to Bedrock (feet): <i>N/A</i>	
Drilling Fluid: <i>None</i>						Number of 14 Headspace Samples: <i>3 Chem Analy</i>		Depth to Water (feet): <i>N/A</i>	
Completion Information: <i>Soil boring - Borehole grouted upon completion</i>						Borehole Diameter (in): <i>6</i>		Elevation <i>895.87</i> and Datum: <i>GS</i>	
						Logged by: <i>F.N</i>		Felix Nehako	
						Checked by: <i>J. Jock</i>		Date: <i>7-3-92</i>	

Depth (feet)	Sample				Field Analysis		LOG		Lithologic Description	Remarks	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic			USCS or Rock Type
1	1	0.5-1.5	24/15	40%	1440	N/A	0.5/0.5		SP/GM	Poorly graded sands with large pebbles, gravels yellowish brown in color	Miscellaneous fill material
2	2	2.5-4	15/22	50%	1445	N/A	0.4/0.4		SP	Poorly graded medium to coarse grained sands, minor silts; low plasticity	10 YR 5/6
3	3	5-6.5	17/26	50%	1455	N/A	0.4/0.4		SP	Brown to yellowish brown medium grained poorly graded sands mixed with gravels	10 YR 4/3
4	4	7.5-10	10/15	60%	1500	N/A	0.4/0.4		SM	Fine to medium grained silty sands; slight plasticity	Brown to dark yellowish color 10 YR 4/4
5	5	10.5-12.5	15/16	80%	1503	N/A	0.4/0.4		SP/SM	Poorly graded silty sands with an increase in clay content towards bottom	10 YR 4/4
6	6	12.5-14	12/46	50%	1510	N/A	0.4/0.4		SC	Yellowish brown clayey silty sands. Med. plasticity	10 YR 5/6
15	Refusal at 15' BGS. Borehole advanced to 17.5' BGS										
7	7	17.5-19	14/26	25%	1515	N/A	0.4/0.4		SC/SM	Fine grained yellowish brown silty, clayey sands	10 YR 5/6
8	8	20-21.5	26/36	50%	1530	N/A	0.4/0.4		SP	Poorly graded medium to coarse grained sands	"
9	9	22.5-24	26/30	50%	1538	N/A	0.4/0.4		SP	Coarse grained sands mixed with minor amount of gravels/pebbles	10 YR 5/6
10	10	25-26.5	11/36	40%	1540	N/A	0.4/0.4		SM	Fine to medium grained silty clayey sands	"
11	11	27.5-29	76/6	25%	1546	N/A	0.4/0.4		SM	Fine to medium grained silty sands. Very small amount of clay (<5%)	10 YR 5/6

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

N/A = Not Applicable

Form F-1009 9/1/91

# Borehole Log

(Continuation Sheet)

Project Name: <i>Ontario Air National Guard Station ESI</i>						Project Number: <i>92890501</i>		Sheet 2 of 2	
Borehole Location: <i>Site 1</i>						Borehole Number: <i>SB4</i>		Logged by: <i>FN</i>	
								Date: <i>6/16/92</i>	

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B		
32.5	12	36.5	36	46%	1553	N/A	0.4/0.4	SP	medium to coarse grained silty sands with some gravel.
34	13	34	14	46%	1600	N/A	0.4/0.4	SM/SC	brown to yellowish brown, fine grained silty, clayey sands; no pebbles/gravel.
35	14	35-36.5	22	62%	1610	N/A	0.4/0.4	SM/SC	dark yellowish brown silty clayey sands; no pebbles/gravel.
36.5			31						
40			40						
45									
50									
55									
60									
65									
70									
75									
80									
85									
90									

*Summary for Client Analysis*

*SB4-14*

*T.D. (P) 36.5'*

\* S/B = Sample reading / background reading; NA = not analyzed

# Borehole Log

Project Name: <i>Ontario Air National Guard Station ESI</i>						Project Number: <i>92840501</i>		
Borehole Location: <i>Site 1</i>						Borehole No. <i>SB5</i>		Sheet 1 of 2
Drilling Agency: <i>Beylik Drilling Inc.</i>						Driller: <i>Gene Gular</i>		
Drilling Equipment: <i>B-61 Mobile Rig</i>						Date Started: <i>6/16/92</i>		Total Depth (feet): <i>36.5</i>
Drilling Method: <i>Helium stem/split spoon sampling</i>						Date Finished: <i>6/16/92</i>		Depth to Bedrock (feet): <i>N/A</i>
Drilling Fluid: <i>None</i>						Number of 15 foot dykes: <i>3 sent to lab.</i>		Depth to Water (feet): <i>N/A</i>
Completion Information: <i>Soil boring - Borehole grouted upon completion</i>						Borehole Diameter (in): <i>6</i>		Elevation <i>895.44</i> and Datum: <i>GS</i>
						Logged by: <i>F.N</i>		<i>Felix Nchaka</i>
						Checked by: <i>J. Jock</i>		Date: <i>7-3-92</i>

Depth (feet)	Sample				Field Analysis		LOG		Lithologic Description	Remarks	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic			USCS or Rock Type
2	1	0.5-1		25%	1650	N/A	0.2/0.2		SM/SP	yellowish brown fine to medium grained silty sands with large gravels/pebbles	10 YR 5/6
5	2	2.5-4		20%	658	N/A	0.2/0.2		SP/SM	pale brown fine to medium grained sands, mixed with pebbles and gravels	10 YR 6/3
	3	5.0-6.5		20%	1705	N/A	0.2/0.2		SP/SM	poorly graded medium to coarse grained sands, mixed with gravels & pebbles.	10 YR 6/3
	4	7.5-9		50%	1710	N/A	0.2/0.2		SP	poorly graded medium to coarse grained sands.	10 YR 6/3
10	5	10.5-11.5		40%	1715	N/A	0.2/0.2		SP	gray, sh brown poorly graded medium to coarse grained sands	10 YR 5/2
	6	12.5-14		50%	1730	N/A	0.2/0.2		SP	yellowish brown medium to coarse grained sands poorly graded.	10 YR 5/6
15	7	15.5-16.5		50%	1740	N/A	0.2/0.2		SM	yellowish brown fine to medium grained silty sands, slight plasticity	10 YR 5/6
	8	17.5-19		75%	1746	N/A	0.2/0.2		SM	fine to medium grained, yellowish brown silty sands	10 YR 5/6
20	9	20.5-21.5		75%	1755	N/A	0.2/0.2		SM	"	"
	10	22.5-24		50%	1805	N/A	0.2/0.2		SP	poorly graded medium to coarse grained sands	10 YR 5/6
25	11	25.5-26.5		50%	1813	N/A	0.2/0.2		SP	"	"
30	12	27.5-29		75%	1825	N/A	0.3/0.2		SP	brownish yellow medium to coarse grained sands	10 YR 6/6

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14-585-04

# Borehole Log

(Continuation Sheet)

Project Name: <u>Dakota Air National Guard Station ES1</u>						Project Number: <u>92890501</u>			Sheet <u>2</u> of <u>2</u>		
Borehole Location: <u>Site 1</u>						Borehole Number: <u>SB5</u>			Logged by: <u>F.N</u>		
									Date: <u>6/16/92</u>		
Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic	USCS or Rock Type
30	13	30-31.5		80%	1632	N/A	0.2/0.2		SM	Silty clayey sands: low to moderate plasticity, clayey in poorly graded silty sands	10 YR 6/6
35	14	31.5-34		80%	1846	N/A	0.2/0.2		SP	Silty sands; zero plasticity loose sands. Pyrite & muscovite flakes present	10 YR 6/6
36.5	15	34-36.5		80%	1850	N/A	0.2/0.2		SM	Silty, clayey sands, low plasticity yellowish brown in color	10 YR 5/6
T.D. @ 36.5'											

\* S/B = Sample reading / background reading; NA = not analyzed

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# Borehole Log

Project Name: <u>Ontario Air National Guard Station ESI</u>						Project Number: <u>42840501</u>		
Borehole Location: <u>Site 1</u>						Borehole No. <u>SB66</u>		Sheet 1 of 2
Drilling Agency: <u>Beylik Drilling, Inc.</u>						Driller: <u>Gene Golar</u>		
Drilling Equipment: <u>13-61 Rig</u>						Date Started: <u>6/17/92</u>		Total Depth (feet): <u>36.5</u>
Drilling Method: <u>Hollow stem / split spoon sampling</u>						Date Finished: <u>6/17/92</u>		Depth to Bedrock (feet): <u>N/A</u>
Drilling Fluid: <u>None</u>						Number of Samples: <u>14;</u> <small>Chemical analysis: 4</small>		Depth to Water (feet): <u>N/A</u>
Completion Information: <u>Soil boring - Borehole grouted upon completion</u>						Borehole Diameter (in): <u>6</u>		Elevation <u>893.67</u> and Datum: <u>GS</u>
						Logged by: <u>FN</u>		<u>Felix Nehako</u>
						Checked by: <u>J. Jock</u>		Date: <u>7-3-92</u>

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks	
	Number	Interval	Blow Count	Recovery	Time	FD (ppm) S/B	PD (ppm) S/B			
1	6.5-1.5'	36 41 50	21	4:30	N/A	0.2/0.2	SP	Poorly graded medium to coarse grained sands; brown to yellowish brown in color	10YR 5/6	
Refusal at 2.5' (86 blow counts) borehole advanced to 5' depth.										
5	2	5-6.5'	46	20%	9:40	N/A	0.2/0.2	SP/GM	Poorly graded medium to coarse grained sands, low plasticity, minor amounts of silt	Buildings encountered, and this the first record 10YR 5/6
10	3	7.5-4'	21 31 40	26%	9:45	N/A	0.2/0.2	SP/GM	Poorly graded medium to coarse grained sands, changing to gravel/cobbles at bottom	Brown color 10YR 5/3
14-26.5	4	8-11.5'	41	40%	9:55	N/A	0.3/0.2	SP/GM	Poorly graded medium to coarse grained sands, changing to gravel at the bottom. 10YR 6/4	Light yellowish brown Asphalt debris seen at the 10-11.5' depth
15	5	12.5-14'	18 26 30	75%	10:05	N/A	0.2/0.2	SP/SAL		
16.5	6	15-16.5'	71	46%	10:15	N/A	0.2/0.2	SM	Light olive gray fine to medium grained silty sands. 5Y 6/2	High moisture content
19	7	17.5-19'	10 26 34	60%	10:20	N/A	0.6/0.2	SM	Light olive gray fine grained silty sands with slight plasticity	5Y 6/2
20	8	20-21.5'	27 30 42	60%	10:30	N/A	0.1/0.1	SM	Light olive gray fine grained silty sands	High moisture content. 5Y 6/2
22.5	9	22.5-24'	30 40 55	75%	10:35	N/A	0.1/0.1	SP	Poorly graded medium to coarse grained sands brown to yellowish brown color	10YR 5/4
25	10	25-26.5'	45 75	25%	10:42	N/A	0.1/0.1	SP		Material did not resemble miscellaneous fill looked more like weathered granite material - relics of muscovite, pyrite & brown prisms
27.5	11	27.5-29'	40 75	75%	10:54	N/A	0.2/0.2	SP		

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

N/A = Not Applicable

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8/1/91

A-11

# Borehole Log

(Continuation Sheet)

Project Name: <i>Entoxic Air Notification Center Station ESI</i>						Project Number: <i>92840501</i>				Sheet <i>2</i> of <i>2</i>	
Borehole Location: <i>Site 1</i>						Borehole Number: <i>S1366</i>				Logged by: <i>F.N.</i>	
										Date: <i>6/17/92</i>	
Depth (feet)	Sample		Field Analysis		LOG		Lithologic Description	Remarks			
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B			PID (ppm) S/B	Graphic	USCS or Rock Type
<i>Summary for chemical analysis</i>											
<i>ENVY-S136-12</i>	<i>12</i>	<i>3.5-15</i>	<i>15</i>	<i>75%</i>	<i>11.05</i>	<i>N/A</i>	<i>0.2/0.2</i>		<i>SM</i>	<i>Proven to contain trace quantities of hydrocarbons - A 16</i>	
	<i>13</i>	<i>15-26</i>	<i>15</i>	<i>75%</i>	<i>11.16</i>	<i>N/A</i>	<i>0.2/0.2</i>		<i>SM</i>	<i>"</i>	
<i>ENVY-S136-14</i>	<i>14</i>	<i>26-34</i>	<i>26</i>	<i>75%</i>	<i>11.15</i>	<i>N/A</i>	<i>0.2/0.2</i>		<i>SM</i>	<i>"</i>	
<i>35</i>										<i>3.5' below is a sand and gravel layer assigned number ENVY-S136-15</i>	
<i>40</i>										<i>T.D. @ 36.5'</i>	
<i>45</i>											
<i>0</i>											
<i>5</i>											
<i>0</i>											
<i>5</i>											

\* S/B = Sample reading / background reading; NA = not analyzed N/A = Not Applicable

# Borehole Log

Project Name: <i>Ontario Air National Guard Station ESI</i>						Project Number: <i>92890501</i>					
Borehole Location: <i>NE corner of Station, next to Air Traffic Control Bldg.</i>						Borehole No. <i>Background MIA</i>			Sheet <i>1</i> of <i>8</i>		
Drilling Agency: <i>Baylik Drilling Inc.</i>						Driller: <i>Charles Celaya</i>					
Drilling Equipment: <i>TAD-7 Becker Rig</i>						Date Started: <i>6/22/92</i>			Total Depth (feet): <i>296</i>		
Drilling Method: <i>Dual Wall Air Percussion</i>						Date Finished: <i>6/27/92</i>			Depth to Bedrock (feet): <i>N/A</i>		
Drilling Fluid: <i>None</i>						Number of Samples: <i>None</i>			Depth to Water (feet): <i>265 BGS</i>		
Completion Information: <i>see completion log</i>						Borehole Diameter (in): <i>11</i>			Elevation and Datum: <i>~ 898</i>		
						Logged by: <i>Felix Nkhumbi</i>					
						Checked by: <i>J. Jock</i>			Date: <i>7-3-92</i>		

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic	USCS or Rock Type		
5									SM	Olive brown fine to medium grained silty sands; loose (no plasticity)	2.5 YR 4/3 very dry.
10									GM/SP	Gravelly silty sands / Olive brown gravelly sands	2.5 YR 4/3
15									GM/SP	yellowish brown gravelly sands, mixed with silts	10 YR 5/6
20									GM	yellowish brown gravel sand-silt mixtures	10 YR 5/4
25									GM	"	"
30									GM	"	"

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

N/A = Not Applicable

# Borehole Log

(Continuation Sheet)

Project Name: Ontario Air National Guard Station ESI						Project Number: 42840501				Sheet 2 of 8	
Borehole Location: NE corner of station property next to Air Traffic Control Bldg.						Borehole Number: M11 - Buckleywell				Logged by: FN	
										Date: 6/22/92	
Depth (feet)	Sample				Field Analysis		LOG		Lithologic Description	Remarks	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PHD (ppm) S/B	Graphic			USCS or Rock Type
35									GM	yellowish brown gravel-sand-silt mixtures	10 YR 5/4
40									SM	yellowish brown fine grained silty sands - no pebbles/gravels; slight plasticity	10 YR 5/6 High moisture content
45									SM/GM	yellowish brown fine grained silty sands mixed with gravels/pebbles. No coarse grained sands.	10 YR 5/6
50									SM	soil concrete nodules silty clayey sands discharged as rounded balls from borehole when cut open, minor laminations of iron oxide were present	High moisture content
55									SM	"	"
60									SM	light olive brown fine to medium grained silty sands No gravels; low plasticity	High moisture content 2.5 Y 5/4
65									SM	"	"
70									Silt	"	2.5 Y 5/6

\* S/B = Sample reading / background reading; NA = not analyzed  
A-14



# Borehole Log

(Continuation Sheet)

Project Name: <i>Estimate the Mechanical Ground Reaction ESI</i>					Project Number: <i>42840561</i>					Sheet <i>3</i> of <i>8</i>	
Borehole Location: <i>NE corner of station property next to Air Traffic Control Building</i>					Borehole Number: <i>MW1 - Background well</i>					Logged by: <i>FA</i>	
										Date: <i>6/22/92</i>	
Depth (feet)	Sample			Field Analysis			LOG		Lithologic Description	Remarks	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PHD (ppm) S/B	Graphic			USCS or Rock Type
75									SM	Light olive brown fine to medium grained silty sands	2.5 Y 5/4 High Moisture Content
80									SM	Light olive brown very fine grained silty sands. Moderate plasticity	2.5 Y 5/4 High Moisture Content
85									SM	"	"
90									SM	"	"
95									SM	Light olive brown fine grained silty sands; low plasticity	2.5 Y 5/4 High moisture content High iron oxide content traces of Fe chlorides (red stains)
100									SP	Medium grained sands mixed with silty sand gravels	throughout intermittent sand nodules/clumps
105									SM	Light olive brown fine grained silty sands	2.5 Y 5/6 High Moisture Content
110									SP	Poorly graded medium to coarse	

\* S/B = Sample reading / background reading; NA = not analyzed

# Borehole Log

(Continuation Sheet)

Project Name: <i>Ontario Air National Guard Station ESI</i>						Project Number: <i>92840SL1</i>				Sheet <i>4</i> of <i>8</i>	
Borehole Location: <i>NE Corner of station</i>						Borehole Number: <i>MW1</i>				Logged by: <i>FM</i>	
Borehole Location: <i>1/2 mi. N. to Air Traffic Control Bldg.</i>										Date: <i>6/22/92</i>	
Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic	USCS or Rock Type
115									SP	grained gravelly sands light olive brown	2.5 Y 5/4
120									SM	Light olive brown fine grained silty sand; low plasticity	2.5 Y 5/4 High Moisture Content
125									SM	"	"
130									SM	"	"
135									SM	"	"
140									SM	Fine grained light olive brown silty sands. soil concretions present. when cut open, observed gummy mounds in soil sample	2.5 Y 5/4 High Moisture Content
145									SP	Coarse grained silty sands; soil concretions present - rounded bulbs of silty sandy material with inclusions of weathered rock residues - weathered micaceous	2.5 Y 6/4 High Moist. Content
150									SM		

\* S/B = Sample reading / background reading; NA = not analyzed  
A-16

# Borehole Log

(Continuation Sheet)

Project Name: <u>Entenair Air National Guard Station ESI</u>						Project Number: <u>92840561</u>				Sheet <u>5</u> of <u>8</u>	
Borehole Location: <u>NW corner of Station Property, next to Air Traffic Control Building</u>						Borehole Number: <u>M-1</u>				Logged by: <u>FN</u>	
										Date: <u>6/28/72</u>	
Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic	USCS or Rock Type
55									SM	Fine grained silty sand	2.5 Y 5/6 High Moist. Content
60									SM	Light olive brown fine grained silty sand	2.5 Y 5/4 High Moist. Content
65									SP	Light yellowish brown medium to coarse grained silty sand with some gravels	2.5 Y 6/4
70									SP	Light olive brown poorly graded medium to coarse grain silty sand mixed with gravels	2.5 Y 5/4
75									SP	"	"
80									SM	Light olive brown silty sand fine grained, low to moderate plasticity	2.5 Y 5/6 High Moisture Content
85									SM	Light yellowish brown fine grained silty sand, low to moderate plasticity	2.5 Y 6/4 High Moisture Content
90									SM	Light olive brown fine to medium grained silty sand low plasticity	2.5 Y 5/4
95									SP	medium to coarse grained poorly	

\* S/B = Sample reading / background reading; NA = not analyzed

# Borehole Log

(Continuation Sheet)

Project Name: Entrance to National Guard Station ESI					Project Number: 42840501					Sheet 6 of 8	
Borehole Location: NE corner of station property next to the Traffic Control Bldg					Borehole Number: 21111					Logged by: F/N	
										Date: 6/23/92	
Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B				
145								GM	graded gravelly sand, gravels, silts and silt mixture	2.5 Y 5/4 starts cl to have very dry cuttings discharged from borehole	
200								GM	"	very dry GM discharged Very hard gravelly layer encountered between the 200-205 depth. Hammer was just bounced on rock layer, no cuttings discharged.	
205								Rock	Hard Rock: Granitic or Quartzitic rock encountered at this depth. This was fractured in order to advance to lower depths ~ 5-10' thick.		
210								SM	Fine grained silty silts very low plasticity light olive brown color	2.5 Y 5/6 Microfine to low moisture content	
215								SM	"	2.5 Y 5/6 Low moist. content	
220								SP/GM	Gravelly sands; light yellowish brown in color. Gravels dominant in water discharges from 220-225 depth interval.	2.5 Y 6/4 dry and very low moisture content	
225								SM	Dark yellowish brown fine grained silty sands, low plasticity	10 Y R 4/6 High Moist. Content	
230								SM/	"	"	

\* S/B = Sample reading / background reading; NA = not analyzed  
A-18

# Borehole Log

(Continuation Sheet)

Project Name: <i>Entine Air National Guard Station ESI</i>					Project Number: <i>4284501</i>					Sheet <i>7</i> of <i>8</i>	
Borehole Location: <i>NE corner of station property next to Air Traffic Control Bldg</i>					Borehole Number: <i>11101</i>					Logged by: <i>FV</i>	
										Date: <i>6/23/92</i>	
Depth (feet)	Sample		Field Analysis		LOG		Lithologic Description	Remarks			
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B			PHD (ppm) S/B	Graphic	USCS or Rock Type
235								SM	Dark yellowish brown fine grained silty sands, low plasticity	10 YR 4/6 High moisture content	
240								SP	Gravelly sands with little amount of fines, medium to coarse grained sands.	10 YR 5/6 Moderate moisture content	
245								SP	Light olive brown fine to coarse grained silty gravelly sands, minor amounts of gravel	2.5 Y 5/6	
250								SM	Dark yellowish brown fine grained silty sands with minor amounts of coarse sand	10 YR 4/6	
255								SM	Yellowish brown fine grained silty sands moderate plasticity	10 YR 5/6 High moisture content	
260								SP	Light olive brown medium to coarse grained sands, silts, sands and some pebbles	very high moisture content 2.5 Y 5/4	
265								SP	"	Water content at this depth (265) (continuation of log from cyclone bore)	
270											

\* S/B = Sample reading / background reading; NA = not analyzed

# Borehole Log

(Continuation Sheet)

Project Name: <i>Entom Air National Guard Station ESI</i>						Project Number: <i>928905C1</i>				Sheet <i>8</i> of <i>8</i>	
Borehole Location: <i>NE corner of Station property just to the Traffic Control Bldg</i>						Borehole Number: <i>MLL1</i>				Logged by: <i>FD</i>	
										Date: <i>6/24/92</i>	
Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic	USCS or Rock Type
275										<i>water contained by saturated with water muddy water plus wet silts sands and gravels</i>  <i>muddy water + wet silts, sands and gravels</i>  <i>T.D. @ 296'</i>	
280											
285											
290											
295											
300											
305											
310											
315											
320											
325											
330											
335											
340											
345											
350											
355											
360											
365											
370											
375											
380											
385											
390											
395											
400											
405											
410											
415											
420											
425											
430											
435											
440											
445											
450											
455											
460											
465											
470											
475											
480											
485											
490											
495											
500											

\* S/B = Sample reading / background reading; NA = not analyzed  
A-20

# Borehole Log

Project Name: <i>Ontario Air National Guard Station ESI</i>						Project Number: <i>92840501</i>					
Borehole Location: <i>NW of the Administration Bldg next to building 4</i>						Borehole No. <i>HW2 (Downgradient)</i>			Sheet 1 of 5		
Drilling Agency: <i>Baylik Drilling Inc.</i>						Driller: <i>Charlie Celaya</i>					
Drilling Equipment: <i>Method: Dual wall Air Percussion</i>						Date Started: <i>6/30/92</i>			Total Depth (feet): <i>281.5</i>		
Drilling Method: <i>Equipment: THB-1 Becker Rig/Bell Work: Air Percussion Hammer</i>						Date Finished: <i>7/1/92</i>			Depth to Bedrock (feet): <i>NA</i>		
Drilling Fluid: <i>None</i>						Number of Samples: <i>None</i>			Depth to Water (feet): <i>255</i>		
Completion Information: <i>See completion log</i>						Borehole Diameter (in): <i>11"</i>			Elevation <i>895.21</i> and Datum: <i>GS</i>		
						Logged by: <i>Felix Nibako</i>					
						Checked by: <i>J. Jock</i>			Date: <i>7-3-92</i>		

Depth (feet)	Sample					Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B*	PHD (ppm) S/B*	Graphic	USCS or Rock Type		
5									SP	Fine to coarse grained sands with some gravel	light olive brown 2.5 Y 5/6
10									SP	Fine to coarse, silty grained sands mixed with minor amounts of gravel	light olive brown fine to coarse grained sand 2.5 Y 5/6
15									SP	fine to coarse grained sands, mixed with some silts, gravel	olive brown 2.5 Y 4/4
20									SM	Fine grained silty sand low plasticity light olive brown	2.5 Y 5/4
25									SM	Light olive brown fine grained silty sand low plasticity	2.5 Y 5/6
30											

Key

\* S/B = Sample reading / background reading;

NA = not analyzed

# Borehole Log

(Continuation Sheet)

Project Name: <i>Citrus Ave. National Guard Station</i>					Project Number: <i>92890501</i>					Sheet <i>2</i> of <i>8</i>	
Borehole Location: <i>Between Administration Building and Creek</i>					Borehole Number: <i>1162 (Downgradient Well)</i>					Logged by: <i>F.N.</i>	
										Date: <i>6/20/92</i>	
Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PHD (ppm) S/B			Graphic	USCS or Rock Type
30											
35									SM	Sandy, silty gravel light yellowish brown 2.5Y 6/4	Gravelly between 30-35' interval
40									SC	Light olive brown <sup>red</sup> fine grained silty sand moderate plasticity May some minor amounts of clay	2.5Y 5/6
45									SM	Fine to medium grained silty sand, low plasticity light olive brown 2.5Y 5/4	Gravelly between 42-45' depth interval
50									SP	Gravelly sands, fine to coarse grained sand silts mixed in light olive brown 2.5Y 5/4	
55									SM	Fine grained silty sand with low plasticity - 20% clay light olive brown	High moisture content 2.5Y 5/6
60									SM	"	"
65									SM	Fine grained silty sand no plasticity (no clays)	2.5Y 5/6
70									SM	Fine grained silty sand light olive brown 2.5Y 5/6 high moisture content moderate plasticity	Gravelly between 60-65' depth interval

\* S/B = Sample reading / background reading; NA = not analyzed  
A-22



# Borehole Log

(Continuation Sheet)

Project Name: <i>Entrance to National Guard Station</i>	Project Number: <i>92890501</i>	Sheet <i>3</i> of <i>8</i>
Borehole Location: <i>NW of Admin Bldg. next to bridge</i>	Borehole Number: <i>M162</i>	Logged by: <i>F.A.</i>
		Date: <i>6/30/92</i>

Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B		
7 5								SP/GM Fine grained silty sand light olive brown low plasticity (20% clay)	High moisture content 2.5 y 5/6
8 0								SP/GM Fine, medium & coarse grained sands, mixed with some gravels light olive brown 2.5 y 5/4	Gravelly between 75-80' depth interval High moisture content
8 5								SP Fine to coarse grained sands. No plasticity	2.5 y 5/4
9 0								SM Fine grained sands, lots of silts. No plasticity. No coarse grained materials	High moisture content 2.5 y 5/6
9 5								SM/SC Very fine grained clayey, silty sands, moderate plasticity. ~30% clay	2.5 y 5/6 High moisture content
10 0								SM/SC Fine grained sands, mixed with silts and clays (15%) moderate plasticity.	High moisture content 2.5 y 5/4
10 5								GM/SP Gravelly sands, silts, silt and gravel mixtures	Moderate moisture content 2.5 y 5/6

\* S/B = Sample reading / background reading; NA = not analyzed

# Borehole Log

(Continuation Sheet)

Project Name: <i>Cut-off at National Guard station</i>						Project Number: <i>92840561</i>			Sheet <i>4</i> of <i>8</i>	
Borehole Location: <i>NW of Admin Bldg west to bridge</i>						Borehole Number: <i>6162</i>			Logged by: <i>F.N</i>	
									Date: <i>6/30/92</i>	
Depth (feet)	Sample		Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B			PHD (ppm) S/B	Graphic
<i>110</i>								<i>SP</i>	<i>Fine to coarse grained sands. No plasticity. Coarse sand</i>	<i>2.54 5/6</i>
<i>115</i>								<i>SP</i>	<i>"</i>	<i>"</i>
<i>120</i>								<i>SP</i>	<i>"</i>	<i>"</i>
<i>125</i>								<i>SP</i>	<i>"</i>	<i>"</i>
<i>130</i>								<i>SM</i>	<i>Fine grained silty sand - 10-10% clay. low plasticity. no coarse grained sands or pebbles.</i>	<i>High moisture content 2.54 5/4</i>
<i>135</i>								<i>SM</i>	<i>Fine grained silty sand. low plasticity yellowish brown silty sand</i>	<i>High moisture content 10YR 5/4</i>
<i>140</i>								<i>SM/CL</i>	<i>Fine grained silty clayey sand. Moderate plasticity dark yellowish brown silty sand high moisture content 10YR 4/4</i>	<i>The concretions/nodules of soil were common past the 140' depth between 140-145'</i>
<i>145</i>								<i>SP</i>	<i>Fine to coarse grained sand with soil concretions. These rounded soil concretion/nodules are hard to break apart</i>	<i>lands are a mix of coarse grained white particles &amp; cementable materials</i>
<i>150</i>										

\* S/B = Sample reading / background reading; NA = not analyzed  
A-24

# Borehole Log

(Continuation Sheet)

Project Name: <i>Cofairic Air National Guard station</i>					Project Number: <i>92890561</i>					Sheet <i>5</i> of <i>8</i>	
Borehole Location: <i>NW of Admin Bldg. off to bridge</i>					Borehole Number: <i>NW 2</i>					Logged by: <i>F.N.</i>	
										Date: <i>6/20/92</i>	
Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PHD (ppm) S/B			Graphic	USCS or Rock Type
155									SP	fine to coarse grained sands with silt / clay from that which broken apart sand minor laminations. low plasticity light olive brown	very dry sands discharged at 150' depth
160									SP	fine to coarse grained sands, silt & pebbles mixed in. No soil concrete	2.5V 5/6
165									SM	Very fine grained silty sand low plasticity. very minor amount of coarse grained yellowish brown silty sand	High moisture content 10YR 5/4
170									SM	fine to medium grained silty sand.	10YR 5/4
175									SM	Fine grained silty sand moderate plasticity	10YR 5/4 yellowish brown silty sand high moisture content
180									SM	fine to medium grained silty sands. light olive brown silty sands. low plasticity	2.5V 5/4 Moderate moisture content
185									SP	gravelly sands. no plasticity, loose sands with some gravel / pebbles	light olive brown sands 2.5V 5/6
190											

\* S/B = Sample reading / background reading; NA = not analyzed

# Borehole Log

(Continuation Sheet)

Project Name: <i>Cutler Hill National General Station</i>					Project Number: <i>92890501</i>					Sheet <i>6</i> of <i>8</i>	
Borehole Location: <i>NE of old main bldg next to bridge</i>					Borehole Number: <i>111602</i>					Logged by: <i>FIN</i>	
										Date: <i>6/30/92</i>	
Depth (feet)	Sample				Field Analysis		LOG		Lithologic Description	Remarks	
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B	Graphic			USCS or Rock Type
195									SP/GM Gravelly sands, silt, sands and gravel mixture	2.5Y 6/4 light yellowish brown	
200									GM sandy gravel, mixed with silts. light yellowish brown	2.5Y 6/4	
205									Hard rock rock rock rock. gravels were discharged - fractured rock to advance boring		
210									Hard rock gravel, fractured rock to advance boring through		
215									SP fine to coarse grained sands. Light yellowish brown.	Low moisture content - almost dry 2.5Y 6/4	
220									SM fine grained silty sand with minor amounts of coarse sand/pebbles. low plasticity. yellowish brown silty sand	High moisture content 10YR 5/4	
225									SM fine grained light olive brown silty sand. low plasticity	High moisture content 2.5Y 5/6	
230									SM very fine grained light olive brown silty sand. low to moderate plasticity	2.5Y 5/6 High moisture content	
235									SM/SP silty sand with considerable amounts of gravels. silty, gravelly sands	2.5Y 4/4	

\* S/B = Sample reading / background reading;  
A-26

NA = not analyzed

Form F-1008A  
9/1/91

## Borehole Log

(Continuation Sheet)

Project Name: Ontario Air National Guard Station ESI					Project Number: 42840501					Sheet 7 of 8	
Borehole Location: NW of Administration Bldg. next to bridge					Borehole Number: MW2					Logged by: FN	
										Date: 7/1/92	
Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic	USCS or Rock Type
									SM/SP	Moderate amount of moisture	
235									SP	Gravelly sands fine to coarse grained silty, gravelly sands olive brown gravelly sands with some fines.	2.5 Y 4/4 Moderate Moisture Content
240									SM/SC	Very fine to medium grained silty, clayey sands (20% clay) low to moderate plasticity	yellowish brown color 10 YR 5/4 High moisture content
245									SP	Light olive brown gravelly sands medium to coarse grained, some silt present; loose sands, no plasticity	2.5 Y 5/6 Low moisture content
250									SM/SC	Fine to medium grained silty sands; low to moderate plasticity (~20% clay)	High moisture content 10 YR 5/4
255									SM	"	"
260									SP	Light olive brown medium to coarse grained sands loose and zero plasticity	2.5 Y 5/6 High Moisture Content
265									SP	"	"
270									SP/SLT	Olive brown Sandy gravels; no silt	High Moisture Content + 2.5

\* S/B = Sample reading / background reading; NA = not analyzed

Form F-1009A

9181

A-27

# Borehole Log

(Continuation Sheet)

Project Name: <i>Ontario Air National Guard Station ESI</i>						Project Number: <i>92890501</i>				Sheet <i>8</i> of <i>8</i>	
Borehole Location: <i>NW 1/4 Admin Bldg. next to bridge</i>						Borehole Number: <i>MW2</i>				Logged by: <i>FN</i>	
										Date: <i>7/1/92</i>	
Depth (feet)	Sample			Field Analysis		LOG		Lithologic Description	Remarks		
	Number	Interval	Blow Count	Recovery	Time	FID (ppm) S/B	PID (ppm) S/B			Graphic	USCS or Rock Type
270									<i>SP/GM</i>	<i>Sandy gravels / gravelly sands</i>	
275									<i>GC/SP</i>	<i>Clayey gravels and some gravelly sands. (~30% gravels). Moderate plasticity (~10% clays)</i>	<i>Dark yellowish brown 10 YR 4/4 Very high moisture content</i>
280									<i>SP/GM</i>	<i>Gravelly sands / silty gravels</i>	
285											
290											
295											
300											
5											
0											

T.D. @ 281.5

\* S/B = Sample reading / background reading; NA = not analyzed

Form F-1009A  
9/1/91

**APPENDIX B**  
**WELL CONSTRUCTION LOGS**

# Monitoring Well Construction Log - Flush Mount

Project Name: <u>Ontario ANG ESI</u>	Project Number: <u>92590501</u>	Date: <u>7-20-92</u>
Well: <u>MW2</u>	Well ID: <u>MW2</u>	Sheet: <u>1 of 1</u>
Driller: <u>Brylik</u>	Borehole Diameter (in): <u>4 1/2" casing</u> <sup>11 7/8" h.d.c.</sup>	Total Depth (m): <u>281</u>
Drilling Agency: <u>Charlie Colquhoun</u>	Date Started: <u>6-29-92</u>	Depth to Water (m): <u>252</u>
Drilling Equipment:	Date Finished: <u>7-20-92</u>	Elevation and Datum: <u>3.25 m</u>
Drilling Method: <u>Double Wall Reverse Circulation</u>	Logged by: <u>Tammy Task</u>	Checked by: <u>CB</u>
Drilling Fluid: <u>Air/Air</u>	Number of Samples: <u>7</u>	Date: <u>24 J 192</u>

## PROTECTIVE CEG

Material Type: GS Christy Bx

Diameter: 12"

Depth BGS: 1' Weep Hole (Y/N) (N)

## GUARD POSTS (Y/N) (N)

No.: \_\_\_\_\_ Type: \_\_\_\_\_

## SURFACE PAD

Composition and Size: 2'x2' Concrete 4" thick

## RISER PIPE

Type: 4 1/2" Schedule 80 PVC

Diameter: 4 1/2"

Total Length (TOC to TOB): 260'

Ventilated Cap (Y/N) (N)

## GROUT

Composition and Proportions: Volclay Bentonite

9.3 to 9.4 lb/gal

Tremied (Y/N) (N) First 50'

Interval BGS: 281' to 251'

## CENTRALIZERS

Depth(s): 291, 260, 180, 100, 20

## SEAL

Type: Bentonite 1/2" tablets

Source: American Colloid Company

Setup / Hydration Time: 2 hours Vol. Fluid Added: 10 gal

Tremied (Y/N) (N)

## FILTER PACK

Type: #3 Sand

AML Used: 12 bags

Tremied (Y/N) (N)

Source: \_\_\_\_\_

Gr. Size Dist: \_\_\_\_\_

## SCREEN

Type: Stainless Steel

Diameter: 4"

Slot Size and Type: 0.01" welded

Interval BGS: 260' - 280'

## WELL FOOT (Y/N) (N)

Interval BGS: 280' - 281' Length: 1'

Bottom Cap (Y/N) (N)

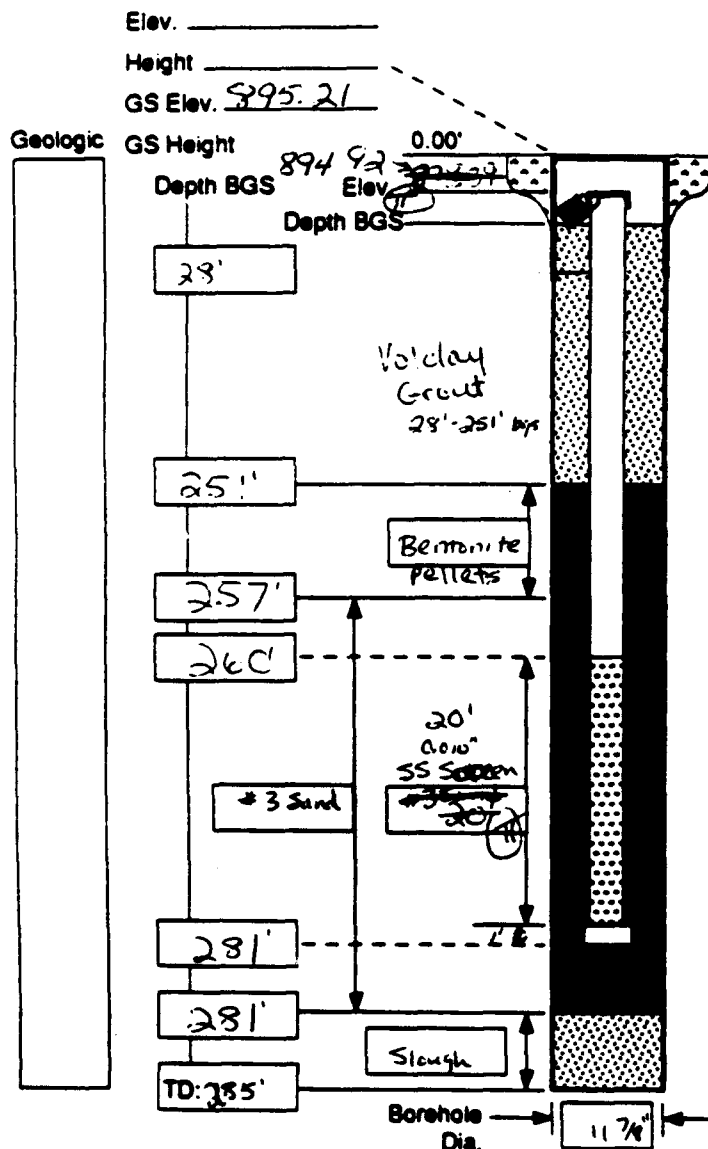
## BACKFILL PLUG

Material: None

Setup / Hydration Time: 2 hours

Tremied (Y/N) (N)

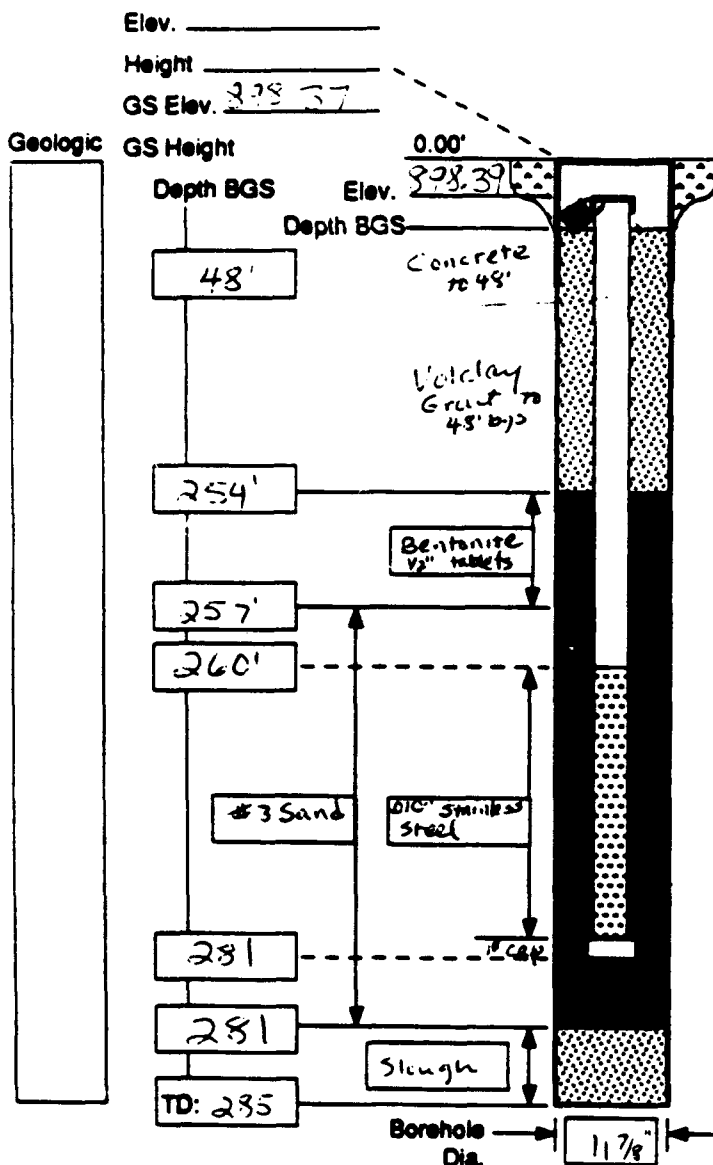
Form F-1023  
9/1/91





# Monitoring Well Construction Log - Flush Mount

Project Name: <u>Ontario ANG</u>	Project Number: <u>92840501</u>	Date: <u>7-20-92</u>
Well: <u>MW3</u>	Well ID: <u>MW3</u>	Sheet: <u>1</u> of <u>1</u>
Owner: <u>Charlie Celaya</u>	Borehole Diameter (in): <u>1 7/8"</u>	Total Depth (ft): <u>281'</u>
Drilling Agency: <u>Beylik</u>	Date Started: <u>7-11-92</u>	Depth to Water (ft): <u>254'</u>
Drilling Equipment:	Date Finished: <u>7-20-92</u>	Elevation and Datum: <u>221.22</u>
Drilling Method: <u>Small Well Percussion - Reverse</u>	Logged by: <u>Tammy Task</u>	Checked by: <u>CSL</u>
Drilling Fluid: <u>Air</u>	Number of Samples: <u>0</u>	Date: <u>6/5/92</u>



## PROTECTIVE CSO

Material / Type: G-5 Christy Box

Diameter: 12"

Depth BGS: 1'

Weep Hole (Y/N) \_\_\_\_\_

## GUARD POSTS (Y/N)

No. \_\_\_\_\_ Type: \_\_\_\_\_

## SURFACE PAD

Composition and Size: 4'x4'x4" Concrete

## RISER PIPE

Type: Schedule 50 PVC

Diameter: 4 1/2"

Total Length (TOC to TOB): 260'

Vented Cap (Y/N) \_\_\_\_\_

## GROUT

Composition and Proportions: Volclay Bentonite

9.3 to 9.4 lb/gal

Tremied (Y/N) First 50'

Interval BGS: 48' to 254' BGS

48' to surface concrete

## CENTRALIZERS

Depth(s): 281, 260, 180, 100, 20'

## SEAL

Type: Bentonite 1/2" tablets

Source: American Celloid Company

Setup / Hydration Time: 2 hrs Vol. Fluid Added: 16 gal

Tremied (Y/N) \_\_\_\_\_

## FILTER PACK

Type: #3 Sand

Am. Used: 12 bags

Tremied (Y/N) \_\_\_\_\_

Source: \_\_\_\_\_

Gr. Size Dist: \_\_\_\_\_

## SCREEN

Type: Stainless Steel

Diameter: 4"

Slot Size and Type: 0.010" Wound

Interval BGS: 260' - 280'

## WELL FOOT (Y/N)

Interval BGS: 280 - 281' Length: 1'

Bottom Cap (Y/N) \_\_\_\_\_

## BACKFILL PLUS

Material: None

Setup / Hydration Time: \_\_\_\_\_

Tremied (Y/N) \_\_\_\_\_

**APPENDIX C**  
**WELL DEVELOPMENT/PURGE RECORDS**

# Well Development/Purge Log

Project Name Ontario ANG ESI Project No. 92890501  
 PID/FID Readings (Ambient) 354.6 BPC (Well Mouth)  
 Static Levels (Product) 352.8 BPC (Water)  
 Pump ☒ Ball ☐ Rate 2.7 gpm Total Gal. Extracted 646  
 Water Column Length 23' Well Volume Extracted 11.8  
 Disposition of Discharge Water 55 gal drums to be transferred to  
Baker Tank  
 Specific Capacity — (approx. drawdown) After — Hrs.

**Well Information**  
 Number MUOZ  
 Location Downgradient  
 Datum TLC  
 Elev. Datum Point 3614.12  
 Ground Elev. 3515.21  
 Well Diameter 4"  
 Well Depth 230'  
 Well Material SS Screen  
PVC casing

**Equipment Information**  
 Bailer No. Beylik's  
 Pump No. Beylik's  
 Interface Probe No. N/A  
 Sounder No. TEC H.A. #9  
 pH Meter No. 72510161  
 Conductivity Meter No. "  
 Thermometer No. "

Time (24 Hr.)	Flow Rate (gpm)	Water Temp. in C°	pH	Cond. umhos/cm	Turbidity NTU	Settleable Solids (ml)	Gallons Dev/Purge Before Meas.	Water Level (feet)	Remarks (e.g. water clarity)
0820	Bailing	—	—	—	—	—	0	354.6 BPC	Began
0840	"	—	—	—	—	—	25	352.8 BPC	Silty Brown
0855	"	—	—	—	—	—	55	—	—
0920	"	21.2	7.09	395	—	—	100	—	Silty Brown, Silty & Sand R.L.S.W.
0930	"	20.8	7.26	398	—	—	110	—	"
0941	"	22.7	6.98	404	—	—	115	—	Sand and sediment up screen
0947	"	23.6	7.26	12	—	—	116	—	Silty
1005 - 1015	Dry Recharging	—	—	—	—	—	130	—	—
1103	Bailing	—	—	—	—	—	140	—	—
1109	"Dry" Recharging	—	—	—	—	—	155-160	—	Mucky Brown to filter pore space
1130	Bailing	—	—	—	—	—	—	354.33 BPC	Sample 1 hr in 15 min per 5 feet
1202	Bailing	—	—	—	—	—	—	352.8 BPC	Handfuls of sand in water
1224	"	20.8	6.77	380	—	—	155	—	—
1255	"	—	—	—	—	—	175	354.97 BPC	—

Notes: 1 ft length of 4" = 0.087 M3 or 0.65 gal X 28' = 18.2 gal X 5 = 54.6 gal  
 1 ft length of 2" = 0.022 M3 or 0.16 gal

Recorded By [Signature] Date 7-10-92  
 Checked By [Signature] Date 245/92

# Well Development/Purge Log

(Continuation Sheet)

Page 2 of 3

Project Name Ontario ANG ESI  
Location Ontario, CA

Project Number 92540501  
Well No. AW2

Date 7.11.92  
Recorded By James Job

Time (24 hr.)	Flow Rate (gpm)	Water Temp. in C°	pH	Cond. $\mu$ mhos/cm	Turbidity NTU	Settleable Solids (ml)	Gallons Dev/Purge Before Mass.	Water Level (feet)	Remarks (e.g. water clarity)
1325	Bailing	20.9	6.80	378	-	-	220	-	Silty but coarse sand gave
1354	"	-	-	-	-	-	275	-	Surged 1/2 hr before resuming bailing
1500	"	21.2	6.83	368	-	-	325	-	Waited 1/2 hr for barrels before resuming
1600	"	-	-	-	-	-	385	-	-
1612	"	21.6	7.46	350	-	-	405	-	-
1630	"	-	-	-	-	-	440 495	-	-
1655	"	23.1	7.60	356	-	-	525 575	-	-
1700	" stepped	-	-	-	-	-	495	-	Silty but no sand bailing
1713								0.54.22670C	
1105 (mid)	Began bailing 2.7 gpm	22.3	6.43	37 (g)	-	-	505 (mid)	-	V Light Brown meter jumping scales?
1135	"	-	-	-	-	-	550	-	Clear water. No solids
1149	"	24.5	6.68	337	-	-	565	-	"
1155	"	24.2	6.75	226	-	-	575	-	"
1157	"	23.9	6.87	31.0	-	-	580	-	" fluctuating sand.
1200	"	23.8	7.07	30.1	-	-	585	-	"
1203	"	23.6	7.15	67.9	-	-	590	-	"
1206	"	23.6	7.17	74.4	-	-	595	-	"

Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal

1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Project Number 92890501  
Well No. MW2

7-14-92

Recorded By Kenny Jack

[illegible]

**Notes:** 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal  
1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

# Well Development/Purge Log

Project Name Ontario ANG ESI Project No. 92890501  
 PDI/FID Readings (Ambient) 254.3 (Well Mouth) 210  
 Static Levels (Product) 254.3 (Water)  
 Pump ( ) / Ball ( ) Rate 10 gpm Total Gal. Extracted 210  
 Water Column Length 25.7' Well Volume Extracted 210  
 Disposition of Discharge Water 55 gal drums to be transferred to Baker tank  
 Specific Capacity — (specific drawdown) After — Hrs.

## Well Information

Number MW-3  
 Location Barleyground P.  
 Datum TX  
 Elev. Datum Point 848.39  
 Ground Elev. 821.537  
 Well Diameter 4 1/2"  
 Well Depth 230'  
 Well Material 5" S. S. casing

## Equipment Information

Bailer No. Baylik's  
 Pump No. Baylik's  
 Interface Probe No. NA  
 Sounder No. 7270 #8-9  
 pH Meter No. Prestotek 61  
 Conductivity Meter No. "  
 Thermometer No. "

Time (24 hr.)	Flow Rate (gpm)	Water Temp. in °C	pH	Cond. umhos/cm	Turbidity NTU	Settleable Solids (ml)	Gallons Dev/Purge Before Meas.	Water Level (feet)	Remarks (e.g. water clarity)
1125	Bailing	23.5	6.48	478	—	—	10	254.3	Thick yellowish Brown
1207	Surging	—	—	—	—	—	15	—	Surged 12 times 30' length
1215	Bailing	23.0	7.51	518	—	—	20	—	Yellowish Brown, silt & fine sand
1235	Ceased Bailing	—	—	—	—	—	30	—	Gr. mostly gone, still silty
1237	—	—	—	—	—	—	—	254.28	—
1653	Began Pumping 10 gpm	37.6 (3)	7.60	383	—	—	40	—	Slightly silty
1656	"	23.2	7.67	384	—	—	55	—	"
1658	"	23.4	7.49	368	—	—	75	—	"
1700	"	23.9	7.45	370	—	—	115	—	Less Silty - Slightly Cloudy
1702	"	23.6	7.46	371	—	—	135	—	"
1704	"	22.8	7.59	370	—	—	135	—	"
1706	"	23.0	7.47	368	—	—	165	—	Slightly Cloudy
1708	"	23.1	7.43	363	—	—	165	—	"
1710	"	22.6	7.40	366	—	—	165	—	Nearly Clear

Notes: 1 ft length of 4" = 0.007 M3 or 0.65 gal X 2.9' = 18.2 gal X 3 = 54.6 gal

1 ft length of 2" = 0.002 M3 or 0.16 gal

Recorded By John Date 7-17-92

Project Name Ontario ANG ES/  
Location Ontario, CA

Project Number 92890501  
Well No. MW3

Date 7-11-12  
Recorded By Jimmy Look

[illegible]

**C-5**

Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal  
1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

SS3a!



# Well Development/Purge Log

Page 1 of 1

Project Name ONTARIO ANG ESL Project No. 92890501 (Well Mouth)  
 PDI/FID Readings NA (Ambient) 252.8 (Water)  
 Static Levels NA (Product) 55  
 Pump ☐ Ball ☒ Rate 28.2' Total Gal. Extracted 3  
 Water Column Length 28.2' Well Volumes Extracted 3  
 Disposition of Discharge Water Drum next to well

Specific Capacity \_\_\_\_\_ (gpm/ft. drawdown) After \_\_\_\_\_ hrs.

Equipment Information  
 Bailor No. MAT-D 1  
 Pump No. ALB  
 Interface Probe No. NA  
 Sounder No. Probes Tech  
 pH Meter No. Probes Tech  
 Conductivity Meter No. Probes Tech  
 Thermometer No. Probes Tech

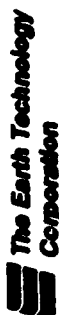
Well Information  
 Number M-2  
 Location Ontario ANG site  
 Datum TOC  
 Elev. Datum Point 894.92  
 Ground Elev. 895.21  
 Well Diameter 4"  
 Well Depth 281'  
 Well Material PVC

Time (24 hr.)	Flow Rate (gpm)	Water Temp. In °C	pH	Cond. µmhos/cm	Turbidity NTU	Settleable Solids (ml)	Gallons Dev/Purge Before Mass.	Water Level (feet)	Remarks (e.g. water clarity)
1221		20.5	6.23	340 (2K)					Silty Drum
1231		19.9	7.14	337 (2K)			10		Sandy
1247		20.2	7.35	337 (2K)			15		Cloudy
1256		20.1	7.43	338 (2K)			20		"
1306		20.0	7.43	339 (2K)			25		"
1315		20.1	7.43	339 (2K)			30		"
1329		20.2	7.46	339 (2K)			35		"
1339		20.3	7.41	337 (2K)			40		"
1343		20.2	7.47	337 (2K)			45		"
1357		20.2	7.43	337 (2K)			50		"
1406		20.5	7.45	337 (2K)			55		"

Recorded By RN Date 7/24/92 Form F-1003  
 Checked By J. S. D. 1044 Date 7-25-92 9/1/81

Notes: 1 ft length of 4" = 0.087 m<sup>3</sup> or 0.65 gal  
 1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal





Project Name Ontario Project No. 928905e1  
 PID/FID Readings \_\_\_\_\_ (Ambient) \_\_\_\_\_ (Well Mouth)  
 Static Levels NA (Product) 255.065856e (Water)  
 Pump ☐ / Ball ☐ Rate \_\_\_\_\_ Total Gal. Extracted 52  
 Water Column Length 25.94 Well Volumes Extracted \_\_\_\_\_  
 Disposition of Discharge Water Draw by well  
 Specific Capacity \_\_\_\_\_ (gpm/ft. drawdown) After \_\_\_\_\_ Hrs. \_\_\_\_\_

Well Information
Number <u>AW-3</u>
Location <u>Ontario ANG-NE corner</u>
Datum <u>TDC</u>
Elev. Datum Point <u>898.39</u>
Ground Elev. <u>898.37</u>
Well Diameter <u>4"</u>
Well Depth <u>281.-</u>
Well Material <u>PVC</u>

Equipment Information

Bailer No.	MATD #1
Pump No.	—
Interface Probe No.	—
Sounder No.	007
pH Meter No.	C-54154 #1
Conductivity Meter No.	Leutb. 101
Thermometer No.	C-54154 #1

[illegible]

Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal  
1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

# Well Development/Purge Log

Project Name Ontario AALG Est Project No. 92890501  
 PID/FID Readings 12 ppm (Ambient) 14 ppm (Well Mouth)  
 Static Levels NA (none) (Product) not rec'd (Water)  
 Pump ☐ Bailing Rate ~ 24' Total Gal. Extracted 50  
 Water Column Length ~ 24' Well Volume Extracted 3  
 Disposition of Discharge Water 55 gallon drum

Specific Capacity \_\_\_\_\_ (gpm/ft. drawdown) After \_\_\_\_\_ Hrs.

**Well Information**  
 Number 0A116-AJW2  
 Location Ontario AALG Est  
 Datum TGS  
 Elev. Datum Point 894.92  
 Ground Elev. 895.21  
 Well Diameter 4 1/2"  
 Well Depth N/A  
 Well Material PVC + SS screen

**Equipment Information**  
 Bailer No. ET #2  
 Pump No. \_\_\_\_\_  
 Interface Probe No. \_\_\_\_\_  
 Sounder No. 400' Net Working  
 pH Meter No. Hydrex #1  
 Conductivity Meter No. \_\_\_\_\_  
 Thermometer No. \_\_\_\_\_

Time (24 hr.)	Flow Rate (gpm)	Water Temp. In $^{\circ}$ F	pH	Conduct. $\mu$ mhos/cm	Turbidity NTU	Residuals Bulbs (ml)	Gelling Time / hr. Before Meas.	Water Level (feet)	Remarks (w/o. water clarity)
1230	Bailing	73.2	7.48	2390	-	-	5	-	Silty
		73.4	7.50	2350	-	-	10	-	
		73.1	7.50	2340	-	-	15	-	
		73.3	7.50	2350	-	-	20	-	
		72.2	7.54	2270	-	-	25	-	
		70.4	7.56	2260	-	-	30	-	
		70.3	7.57	2310	-	-	35	-	Clearing some
		70.5	7.59	2290	-	-	40	-	
		70.5	7.62	2290	-	-	45	-	
1315		70.6	7.61	2290	-	-	50	-	
1600	After sampling	71.7	7.51	2390	-	-	-	-	Almost clear

Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal  
 1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Recorded By Jim Vallingbaum Date 9-10-92 Form F-1003  
 Checked By J. Vallingbaum Date 9-10-92 9/1/93

# Well Development/Purge Log

Page 1 of 1

Project Name Ontario ANG ES Project No. 92890501  
 PID/FID Readings 128800 (Ambient) 308800 (Well Mouth)  
 Static Levels None (Product) 257.15 (Water)  
 Pump ☐ / Ball ☒ Rate 5 gpm in 10 min Total Gal. Extracted (55) 50 gal  
 Water Column Length 24.43 Well Volumes Extracted 3 sampling  
 Disposition of Discharge Water Baker Tank

Specific Capacity \_\_\_\_\_ (gpm/ft. drawdown) After \_\_\_\_\_ Hrs.

**Well Information**  
 Number MW3  
 Location Ontario ANG ES  
 Datum TWC  
 Elev. Datum Point 848.29  
 Ground Elev. 848.29  
 Well Diameter 4 1/2" 848.37  
 Well Depth 231.53' BDC  
 Well Material PVC + SS screen

**Equipment Information**  
 Bailer No. ET #2  
 Pump No. \_\_\_\_\_  
 Interface Probe No. \_\_\_\_\_  
 Sounder No. 400 - not working  
 pH Meter No. Hydric 41  
 Conductivity Meter No. 11  
 Thermometer No. 11

Time (24 hr.)	Flow Rate (gpm)	Water Temp. (°F)	pH	Cloud (umho/cm)	Turbidity NTU	Releasable Bacteria (ml)	Gallons Flow/Hr. Before Meas.	Water Level (feet)	Remarks (w/o. water clarity)
0900	Bailing	69.5	6.94	2450	-	-	5	NA	Silty
0909		67.9	6.79	2390	-	-	10		
0918		67.8	6.71	2330	-	-	15		
0923		66.9	6.75	2330	-	-	20		
-		66.0	7.09	2200	-	-	25		
1005		67.1	7.29	2220	-	-	30		
1018		66.9	7.27	2230	-	-	35		
1029		67.2	7.29	2230	-	-	40		
1040		68.1	7.34	2250	-	-	45		
-		68.1	7.36	2220	-	-	50		
1430		69.4	7.48	2240	-	-	(55)		Clearing somewhat
									Slightly Silty (After sampling)

Notes: 1 ft length of 4" = 0.087 ft<sup>3</sup> or 0.65 gal  
 1 ft length of 2" = 0.022 ft<sup>3</sup> or 0.16 gal

Recorded By Jim Valladares Date 9-10-92 Form F-1003  
 Checked By J. Jozak Date 9-10-92 9/1/91

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**APPENDIX D**  
**SOIL ORGANIC VAPOR SURVEY REPORT**



**Prepared for:**

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**Shallow Soil Gas  
Investigation**

**148TH Combat Communication Squadron  
California Air National Guard  
Ontario, California  
June 1-4, 1992**

**Submitted by:**

*Margaret D. Stevens*  
*Karen McWhorter*

1-92-147-S

D-1

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## 1.0 148TH COMBAT COMMUNICATION SQUADRON INVESTIGATION

Tracer Research Corporation (Tracer Research) performed a shallow soil gas investigation at the 148th Combat Communication Squadron, California Air National Guard (ANG), Ontario, California. The investigation was conducted June 1 through 4, 1992, for The Earth Technology Corporation.

### 1.1 Objective

The purpose of the investigation was to evaluate and delineate the extent of possible soil and groundwater contamination by screening shallow soil gas for the presence of volatile organic chemicals (VOCs). Soil gas samples were collected and analyzed for the following halocarbons and hydrocarbons.

- 1,1,1-trichloroethane (TCA)
- trichloroethene (TCE)
- tetrachloroethene (PCE)
- 1,1-dichloroethene (1,1-DCE)
- trans-1,2-dichloroethene (trans-1,2-DCE)
- benzene, toluene, ethylbenzene, and xylenes (BTEX)
- total volatile hydrocarbons (TVHC)

### 1.2 Overview of Results

For this investigation, 34 soil gas samples were collected at depths of 4 to 6 feet below grade from 34 locations. TCA and PCE were detected throughout the site in concentrations ranging from 0.002 to 0.05 micrograms per liter (ug/L). The detected concentrations of TCA and PCE were approximately equal to the concentrations of TCA and PCE detected in the ambient air samples collected during the course of the investigation.

No benzene, ethylbenzene, xylenes, 1,1-DCE, nor trans-1,2-DCE were detected in the samples. Toluene was detected in one sample at a concentration of 10 micrograms per liter (ug/L). TVHC was detected in 8 of the samples in concentrations from 0.09 to 10 ug/L.





## 2.0 SITE DESCRIPTION

The site consists of fill material to 10 to 15 feet below grade. According to The Earth Technology Corporation, the depth to groundwater is approximately 250 feet below grade. The direction of groundwater flow is to the south-southwest.

## 3.0 SAMPLING PARAMETERS

Soil gas sampling probes consisted of 7-foot lengths of 3/4-inch diameter hollow steel pipe. The probes were fitted with detachable drive tips and advanced to depths of 4 to 6 feet below ground surface (bgs). In some areas, the installation of probes was difficult due to the nature of the backfill. All of the probes were hydraulically or pneumatically pounded to the desired depths.

The aboveground end of each probe was fitted with an aluminum reducer (manifold) and a length of polyethylene tubing leading to a vacuum pump. Soil gas was pulled by the vacuum pump into the probe. Samples were collected in a glass syringe by inserting a syringe needle through a silicone rubber segment in the evacuation line and down into the steel probe. The vacuum was monitored by a vacuum gauge to ensure an adequate gas flow from the vadose zone was maintained.

The volume of air within the probe was purged by evacuating 2 to 5 probe volumes of gas. The evacuation time in minutes versus the vacuum in inches of mercury (Hg) was used to calculate the necessary evacuation time. The vacuum in inches Hg was recorded at each sampling location.

Sample probe vacuums ranged from 2 to 13 inches Hg. The vacuum capacity of the pump was approximately 25 inches Hg.

## 4.0 ANALYTICAL PARAMETERS

During this investigation, 2 to 10 milliliters (mL) of soil gas were collected for each sample and immediately analyzed in the Tracer Research analytical van. Subsamples (replicates) from these samples were injected into the gas chromatograph (GC) in volumes of 500 microliters (uL) for detection on the FID. For detection on the ECD, subsamples were injected into the GC in volumes ranging from 500 to 1,000 uL.



#### 4.1 Analyte Class

The soil gas samples were analyzed for the following analyte classes and compounds:

**Analyte Class: Aromatic and Aliphatic Hydrocarbons**

benzene, toluene, ethylbenzene, xylenes (BTEX)

total volatile hydrocarbons (TVHC)

**Analyte Class: Halocarbon**

1,1,1-trichloroethane (TCA)

trichlorethene (TCE)

tetrachloroethene (PCE)

1,1-dichloroethene (1,1-DCE)

trans-1,2-dichloroethene (trans-1,2-DCE)

#### 4.2 Chromatographic System

A Hewlett Packard 5890 Series II gas chromatograph, equipped with an electron capture detector (ECD), a flame ionization detector (FID), and two computing integrators, was used for the soil gas analyses. Halocarbons were separated in the GC on a 6 foot by 1/8 inch outer diameter (OD) packed analytical column (1% SP1000 stationary phase bonded to 60/80 mesh Carbopack B support). Hydrocarbons were separated on a 6 foot by 1/8 inch OD analytical column packed with 10% OV101 stationary phase bonded to 80/100 mesh Chromosorb W support. The GC was temperature programmable and nitrogen was used as the carrier gas.

The instrument calibrations were checked periodically throughout each day to monitor the response factor and retention time. The following paragraphs explain the GC, ECD, and FID processes.

##### GC Process

The soil gas vapor is injected into the GC where it is swept through the analytical column by the carrier gas. The detector senses the presence of a component different from the carrier gas and converts that information to an electrical signal. The components of the



sample pass through the column at different rates, according to their individual properties, and are detected by the detector. Compounds are identified by the time it takes them to pass through the column (retention time).

### **ECD Process**

The ECD captures low energy thermal electrons that have been ionized by beta particles. The flow of these captured electrons into an electrode produces a small current, which is collected and measured. When the halogen atoms (halocarbons) are introduced into the detector, electrons that would otherwise be collected at the electrode are captured by the sample, resulting in decreased current. The current causes the computing integrator to record a peak on a chromatogram. The area of the peak is compared to the peak generated by a known standard to determine the concentration of the analyte.

### **FID Process**

The FID utilizes a flame produced by the combustion of hydrogen and air. When a component, which has been separated on the GC analytical column, is introduced into the flame, a large increase in ions occurs. A collector with a polarizing voltage is applied near the flame and the ions are attracted and produce a current, which is proportional to the amount of the sample compound in the flame. The electrical current causes the computing integrator to record a peak on a chromatogram. By measuring the area of the peak and comparing that area to the integrator response of a known aqueous standard, the concentration of the analyte in the sample is determined.

## **4.3 Analyses**

The detection limits for target compounds depend on the sensitivity of the detector to the individual compound as well as the volume of the injection. The detection limits of the target compounds were calculated from the response factor, the sample size, and the calculated minimum peak size (area) observed under the conditions of the analyses. If any compound was not detected in an analysis, the detection limit is given as a "less than" value, e.g., <0.1 ug/L. The approximate detection limits for the target compounds are presented in the table on the following page.



Table 1. Detection Limits for Soil Gas Compounds

Compound	Detection Limits (ug/L)
Benzene	0.02
Toluene	0.04
Ethylbenzene	0.07
Xylenes	0.09
Total volatile hydrocarbons	0.08
1,1,1-trichloroethane	0.0007
Trichlorethene	0.0002
Tetrachloroethene	0.0002
1,1-dichloroethene	0.01
Trans-1,2-dichloroethene	0.03

## 5.0 VARIANCES FROM TRACER'S QA PROGRAM

Three different concentrations of standards for each target analyte were analyzed for the initial calibration of the GC, ECD and FID. These three-point calibrations were performed to make sure analyses for the target compounds were within the linear range of the analytical equipment.

The standards for the three-point calibrations were made from National Institute of Sciences and Technology (NIST) traceable standards and reagent blanked solvents. The data from the three-point calibrations are included in Appendix B.

## 6.0 QUALITY ASSURANCE AND QUALITY CONTROL

Tracer Research's Quality Assurance (QA) and Quality Control (QC) program was followed to maintain data that was reproducible through the investigation. An overview presenting the significant aspects of this program is presented below.

### Soil Gas Sampling Quality Assurance

To ensure consistent collection of soil gas samples, the following procedures are performed:

#### - Sampling Manifolds

Tracer Research's custom designed sampling manifold connects the sample probe to the vacuum line and pump. The manifold is designed to eliminate sample exposure to the polymeric (plastic) materials that connect the probe to the vacuum pump.

The sampling manifold is attached to the end of the probe, forming an air tight union between the probe and the silicone tubing septum. The septum connects the manifold to the pump vacuum line and permits syringe sampling.

This sampling system allows the sample to be taken upstream of the sampling pump, manifold, and septum. Since cross contamination of sampling equipment can be a major problem, Tracer Research replaces the materials (probe and syringe), between sampling points, that contact the soil gas before or during sampling.

#### -Sampling Probes

Steel probes are used only once each day. To eliminate the possibility of cross contamination, they are washed with high pressure soap and hot water spray, or steam-cleaned. Enough sampling probes are carried on each van to avoid the need to re-use any during the day.

#### -Glass Syringes

Glass syringes are used for only one sample a day and are washed and baked out at night. If they must be used twice, they are purged with carrier gas (nitrogen) and baked out between probe samplings.



### -Sampling Efficiency

Soil gas pumping is monitored by a vacuum gauge to ensure that an adequate flow of gas from the soil is maintained. A reliable gas sample can be obtained if the sample vacuum gauge reading is at least 2 inches Hg less than the maximum measured vacuum of the vacuum pump.

### Analytical Quality Assurance Samples

Quality assurance samples are performed at the below listed, or greater, frequencies. The frequency depends on the number of soil gas samples analyzed and the length of time of the survey:

**Table 2. Quality Assurance Samples**

Sample type	Frequency
Ambient Air Samples	2 per day or per site
Analytical Method Blanks	5% (1 per 20 samples or 1 a day)
Continuing Calibration Check	20% (1 every 5 samples)
Field System Blank	10% (1 every 10 samples or 1 a day)
Reagent Blank	1 per set of working standards
Replicate Samples	10 % of all soil gas samples

The ambient air samples are obtained on site by sampling the air immediately outside the mobile analytical van and directly injecting it into the GC. Analytical method blanks are taken to demonstrate that the analytical instrumentation is not contaminated. These are performed by injecting carrier gas (nitrogen) into the GC with the sampling syringe. Subsampling syringes are also checked in this fashion.



The injector port septa through which soil gas samples are injected into the GC are replaced daily to prevent possible gas leaks from the chromatographic column. All sampling and subsampling syringes are decontaminated after use and are not used again until they have been decontaminated by washing in anionic detergent and baking at 90°C.

Field system blanks are analyzed to check for contamination of the sampling apparatus, e.g., probe and sampling syringe. A sample is collected using standard soil gas sampling procedures, but without putting the probe into the ground. The results are compared to those obtained from a concurrently sampled ambient air analysis.

If the blanks detect compounds of interest at concentrations that indicate equipment contamination or concentrations that exceed normal background levels (ambient air analysis), corrective actions are performed. If the problem cannot be corrected, an out-of-control event is documented and reported.

A reagent blank is performed to ensure the solvent used to dilute the stock standards is not contaminated. Analytical instruments are calibrated daily using fresh working standards made from National Institute of Sciences and Technology traceable standards and reagent blanked solvents.

Quantitative precision is assured by replicating analysis of 10 percent of the soil gas samples. Replicate analyses are performed by subsampling vapors from the original sampling syringe.

## 7.0 RESULTS

The analytical results from this soil gas investigation are condensed in Appendix A. The data are presented by location and by analyte concentration. When the compound was not detected, the detection limit is presented as a "less than" value, e.g., <0.01 ug/L.

Soil gas samples are identified by sample location and sampling depth. For example, SG-1-5' represents soil gas sample number one, collected at a depth of 5 feet below the ground surface. A summary of the soil gas investigation is presented in a table on the following page.



Table 3. Soil Gas Sample Summary

Compound	# of samples in which compound was detected	Low conc. ug/L	High conc. ug/L	Sample(s) with high conc.
Benzene	0	NA	NA	NA
Toluene	1	NA	10	SG-1
Ethylbenzene	0	NA	NA	NA
Total xylenes	0	NA	NA	NA
TVHC	8	0.09	10	SG-1
TCA	34	0.002	0.02	SG-2
TCE	2	NA	0.0007	SG-19 SG-20
PCE	33	0.002	0.05	SG-31
1,1-DCE	0	NA	NA	NA
Trans-1,2-DCE	0	NA	NA	NA

NA = Not Applicable

TCA was detected in all 34 samples collected at the site. The concentrations detected were approximately equal to the concentrations of TCA detected in air samples



collected during the course of the investigation. TCA was detected in five of seven ambient air samples collected, with concentrations ranging from 0.003 to 0.03 ug/L.

PCE was detected in 33 of 34 samples. PCE was also approximately equal to concentrations detected in the air on site. PCE was detected in four of seven ambient air samples in concentrations ranging from 0.001 to 0.01 ug/L.

No benzene, ethylbenzene, or xylenes were found on site. Toluene was detected in one sample (SG-1) at a concentration of 10 ug/L. TVHC was found in 8 samples ranging in concentrations from 0.09 to 10 ug/L.



APPENDIX A Condensed Data

TRACER RESEARCH CORPORATION - ANALYTICAL RESULTS  
 EARTH TECHNOLOGY / CALIFORNIA AIR NATIONAL GUARD / ONTARIO, CALIFORNIA / OB#1-92-147-S  
 (K601)P2

SAMPLE	1,1DCE ug/l	TRANS 1,2DCE ug/l	TOC ug/l	TCE ug/l	PCE ug/l	BENZENE ug/l	TOLUENE ug/l	ETHYL BENZENE ug/l	XYLENES ug/l	TVHC ug/l
AIR	<0.006	<0.02	0.02	<0.0002	0.004	<0.05	<0.1	<0.09	<0.09	<0.08
SG-1-5.5'	<0.01	<0.03	0.01	<0.0004	0.004	<0.05	10	<0.09	<0.09	10
AIR	<0.006	<0.02	<0.0003	<0.0002	<0.0002	<0.05	<0.1	<0.09	<0.09	<0.08
SG-2-5'	<0.006	<0.02	0.02	<0.0002	0.002	<0.05	<0.1	<0.09	<0.09	<0.08
SG-3-4.5'	<0.006	<0.02	0.01	<0.0002	0.005	<0.05	<0.1	<0.09	<0.09	<0.08
SG-4-4.5'	<0.006	<0.02	0.01	<0.0002	0.002	<0.05	<0.1	<0.09	<0.09	<0.08
SG-5-5'	<0.006	<0.02	0.01	<0.0002	0.009	<0.05	<0.1	<0.09	<0.09	<0.08
AIR	<0.006	<0.02	0.003	<0.0002	0.001	<0.05	<0.1	<0.09	<0.09	<0.08

Analyzed by: B. Hickman

Prepared by: [Signature]

TRACER RESEARCH CORPORATION - ANALYTICAL RESULTS  
 EARTH TECHNOLOGY / CALIFORNIA AIR NATIONAL GUARD / ONTARIO, CALIFORNIA / JOB #1-92-147-S  
 (K40)392

SAMPLE	TRANS		TCA	TCE	PCE	BENZENE	TOLUENE	ETHYL		TVHC
	1,1 DCE	1,2 DCE						BENZENE	XYLENES	
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
AIR	<0.02	<0.06	<0.001	<0.0007	<0.0009	<0.04	<0.09	<0.1	<0.2	<0.2
SG-6-5'	<0.01	<0.03	0.01	<0.0004	0.003	<0.02	<0.04	<0.07	<0.1	0.7
SG-7-6'	<0.01	<0.03	0.008	<0.0004	0.004	<0.02	<0.04	<0.07	<0.1	0.6
SG-8-6'	<0.01	<0.03	0.007	<0.0004	0.003	<0.02	<0.04	<0.07	<0.1	<0.09
SG-9-5'	<0.01	<0.03	0.006	<0.0004	0.006	<0.02	<0.04	<0.07	<0.1	<0.09
SG-10-4'	<0.01	<0.03	0.003	<0.0004	0.006	<0.02	<0.04	<0.07	<0.1	<0.09
SG-11-4'	<0.01	<0.03	0.005	<0.0004	0.004	<0.02	<0.04	<0.07	<0.1	<0.09
SG-12-5'	<0.01	<0.03	0.002	<0.0004	0.002	<0.02	<0.04	<0.07	<0.1	<0.09
SG-13-5'	<0.01	<0.03	0.01	<0.0004	0.003	<0.02	<0.04	<0.07	<0.1	<0.09
SG-14-6'	<0.01	<0.03	0.003	<0.0004	0.01	<0.02	<0.04	<0.07	<0.1	<0.09
SG-15-6'	<0.01	<0.03	0.007	<0.0004	0.01	<0.02	<0.04	<0.07	<0.1	<0.09
SG-16-6'	<0.01	<0.03	0.007	<0.0004	0.005	<0.02	<0.04	<0.07	<0.1	0.09
SG-17-5'	<0.01	<0.03	0.009	<0.0004	0.003	<0.02	<0.04	<0.07	<0.1	<0.09
SG-18-6'	<0.01	<0.03	0.006	<0.0004	0.006	<0.02	<0.04	<0.07	<0.1	<0.09
SG-19-6'	<0.01	<0.03	0.005	0.0007	0.005	<0.02	<0.04	<0.07	<0.1	0.4
SG-20-6'	<0.01	<0.03	0.005	0.0007	0.006	<0.02	<0.04	<0.07	<0.1	<0.09
AIR	<0.02	<0.06	0.03	<0.0007	0.01	<0.04	<0.09	<0.1	<0.2	0.4

TRACER RESEARCH CORPORATION - ANALYTICAL RESULTS  
 EARTH TECHNOLOGY / CALIFORNIA AIR NATIONAL GUARD / ONTARIO, CALIFORNIA / JOB #1-92-147-S  
 6/04/92

SAMPLE	TRANS		TCA	TCE	PCE	BENZENE	TOLUENE	ETHYL		XYLENES	TVHC
	1,1 DCE	1,2 DCE						BENZENE	BENZENE		
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
AIR	<0.02	<0.06	0.008	<0.0007	<0.001	<0.04	<0.08	<0.1	<0.2	<0.2	<0.2
SG-21-6'	<0.01	<0.03	0.007	<0.0004	0.006	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
SG-22-5'	<0.01	<0.03	0.007	<0.0004	0.009	<0.02	<0.04	<0.07	<0.09	<0.09	0.09
SG-23-6'	<0.01	<0.03	0.007	<0.0004	0.007	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
SG-24-6'	<0.01	<0.03	0.006	<0.0004	0.008	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
SG-25-5'	<0.01	<0.03	0.007	<0.0004	0.009	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
SG-26-6'	<0.01	<0.03	0.008	<0.0004	0.01	<0.02	<0.04	<0.07	<0.09	<0.09	0.2
SG-27-5'	<0.01	<0.03	0.006	<0.0004	0.01	<0.02	<0.04	<0.07	<0.09	<0.09	0.2
SG-28-6'	<0.01	<0.03	0.005	<0.0004	<0.001	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
SG-29-6'	<0.01	<0.03	0.004	<0.0004	0.005	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
SG-30-5'	<0.01	<0.03	0.005	<0.0004	0.004	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
SG-31-6'	<0.01	<0.03	0.009	<0.0004	0.05	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
SG-32-5'	<0.01	<0.03	0.009	<0.0004	0.02	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
SG-33-5'	<0.01	<0.03	0.006	<0.0004	0.006	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
SG-34-6'	<0.01	<0.03	0.005	<0.0004	0.006	<0.02	<0.04	<0.07	<0.09	<0.09	<0.09
AIR	<0.02	<0.06	0.01	<0.0007	0.005	<0.04	<0.08	<0.1	<0.2	<0.2	<0.2

Analyzed by: J. Bennett

Prepared by: *SP2 (Shelley)*



**APPENDIX B Three-point Calibration Data**

## REGRESSION ANALYSIS FOR: Benzene, Toluene, Ethyl Benzene, Xylenes, TVHC

Client: Earth Technology

Location: Ontario, California

Benzene CONC	Benzene AREA	Toluene CONC	Toluene AREA	Ethyl Benzene CONC	Ethyl Benzene AREA
500	442713	500	425652	500	425882
1000	759734	1000	747256	1000	809364
2000	1373362	2000	1339713	2000	1026010

Xylenes CONC	Xylenes AREA	TVHC CONC	TVHC AREA
500	404808	500	424763
1000	816713	1000	783266
2000	2180706	2000	1479947

## Regression Output: BENZENE

Constant 135899  
 Std Err of Y Est 5455.871  
 R Squared 0.999934  
 No. of Observations 3  
 Degrees of Freedom 1

X Coefficient(s) 619.4606  
 Std Err of Coef. 5.051155  
 R = 0.999967

## Regression Output: TOLUENE

Constant 129423.5  
 Std Err of Y Est 13563.78  
 R Squared 0.999572  
 No. of Observations 3  
 Degrees of Freedom 1



X Coefficient(s) 606.9573  
Std Err of Coef. 12.55762  
R = 0.999786

Regression Output: ETHYL  
BENZENE

Constant 317559  
Std Err of Y Est 147078.7  
R Squared 0.88289  
No. of Observations 3  
Degrees of Freedom 1

X Coefficient(s) 373.8797  
Std Err of Coef. 136.1684  
R = 0.939622

Regression Output: XYLENES

Constant -277189  
Std Err of Y Est 144370  
R Squared 0.987938  
No. of Observations 3  
Degrees of Freedom 1

X Coefficient(s) 1209.655  
Std Err of Coef. 133.6606  
R = 0.993951

Regression Output: TVHC

Constant 76422.5  
Std Err of Y Est 5432.085  
R Squared 0.999949  
No. of Observations 3  
Degrees of Freedom 1

X Coefficient(s) 702.4881  
Std Err of Coef. 5.029133  
R = 0.999974



## REGRESSION ANALYSIS FOR: 1,1 DCE, Trans 1,2-DCE, TCA, TCE, PCE

Client: Earth Technology

Location: Ontario, California

1,1 DCE CONC	1,1 DCE AREA	Trans 1,2 DCE CONC	Trans 1,2 DCE AREA	TCA CONC	TCA AREA
200	3345389	200	727981	2.5	221019
400	6322266	400	1437093	5	638121
800	12582328	800	2928048	10	1606320

TCE CONC	TCE AREA	PCE CONC	PCE AREA
5	314268	2.5	714831
10	1371266	5	1548288
20	3632726	10	3929610

Regression Output: 1,1 DCE

Constant	215358
Std Err of Y Est	81864.26
R Squared	0.999849
No. of Observations	3
Degrees of Freedom	1
X Coefficient(s)	15431.36
Std Err of Coef.	189.4789
R =	0.999925

Regression Output: Trans 1,2 DCE

Constant	-17496.5
Std Err of Y Est	19438.18
R Squared	0.99985
No. of Observations	3
Degrees of Freedom	1
X Coefficient(s)	3675.437
Std Err of Coef.	44.99064
R =	0.999925



Regression Output: TCA  
Constant -263081  
Std Err of Y Est 35811.67  
R Squared 0.99873  
No. of Observations 3  
Degrees of Freedom 1  
X Coefficient(s) 185982.9  
Std Err of Coef. 6631.033  
R = 0.999365

Regression Output: TCE  
Constant -816462  
Std Err of Y Est 39411.41  
R Squared 0.99973  
No. of Observations 3  
Degrees of Freedom 1  
X Coefficient(s) 221932.7  
Std Err of Coef. 3648.788  
R = 0.999865

Regression Output: PCE  
Constant -475830  
Std Err of Y Est 190933.6  
R Squared 0.993451  
No. of Observations 3  
Degrees of Freedom 1  
X Coefficient(s) 435441.1  
Std Err of Coef. 35354.03  
R = 0.99672

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**APPENDIX E**  
**CHAIN-OF-CUSTODY RECORDS**

# CHAIN-OF-CUSTODY RECORD

498513 498521 498528 498532 498533

499461 499462 499463 499504 499505

498477 448478 418479 428481 408483 418484

498474 498475 498507 498508 498509

[illegible]



COMPUCHEM  
LABORATORIES

# CHAIN-OF-CUSTODY RECORD

No 025338

499705  
709  
714  
718  
719  
720  
721  
722  
723  
724  
725  
726  
727  
728  
729  
730  
731  
732  
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734  
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736  
737  
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739  
740  
741  
742  
743  
744  
745  
746

PROJECT NAME: *Onion's A/E*

PROJECT NUMBER: *92870501*

SAMPLERS (SIGNATURE)

*Dean Wright*

PRINTED NAME

CLIENT ID (9 CHARACTERS)

1 2 3 4 5 6 7 8 9

C A N G F B 1

C A N G F B 2

C A N G F B 2

C A N G S B 6

C A N G S B 5

C A N G S B 6

C A N G S B 5

C A N G S B 6

C A N G S B 5

C A N G S B 6

C A N G S B 5

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C A N G S B 5

C A N G S B 6

No. of Bottles/Vials

GC/MS

GC

INORGANICS

OTHER

MATRIX: Water/Soil

SAMPLING INFO

REMARKS

DATE

TIME

6-16-92

+6-17-92

ONE VOA

CHANGED arrived

broken

6-17 1000

6-17 0920

6-17 1700

6-17 1105

6-16 1755

6-17 1115

6-16 1715

6-16 1850

6-17 1020

6-17 1115

6-17 0955

6-17 1115

6-17 0955

6-17 1115

6-17 0955

6-17 1115

6-17 0955

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6-17 0955

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6-17 1115

6-17 0955

6-17 1115

RELINQUISHED BY

DATE

6-17-92

1000

1000

1000

1000

1000

1000

1000

1000

COMPANY NAME

DATE

6-17-92

1000

1000

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1000

RECEIVED BY

DATE

6-17-92

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COMPANY NAME

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6-17-92

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RELINQUISHED BY

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6-17-92

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COMPANY NAME

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6-17-92

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RELINQUISHED BY

DATE

6-17-92

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COMPANY NAME

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RELINQUISHED BY

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COMPANY NAME

DATE

6-17-92

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1000

1000

1000

# CHAIN-OF-CUSTODY RECORD

No 028669

PROJECT NAME: Ontario HNG

PROJECT NUMBER: 92890501

SAMPLERS (SIGNATURE)

*Tammy Tusk*

PRINTED NAME  
Tammy Tusk

CLIENT ID (9 CHARACTERS)

1	2	3	4	5	6	7	8	9
O	A	N	G	M	W	3	0	1
O	A	N	G	M	W	3	0	2
O	A	N	G	M	W	2	0	1
O	A	N	G	A	B	1		
O	A	N	G	E	B	2		
O	A	N	G	T	B	4		

No. of Bottles/Vials

624-8240

625-8270

TCL-VOA

TCL-SVOA

Other:

601-8010

602-8020

608-8080

8140

TCL PEST/PCBs

Herbicides

Other:

Metals

Cyanide

TAL Metals

Other:

TOC

Oil & Grease

Pet Hydro.

Phenols

OTHER

INORGANICS

GC

GC/MS

#

MATRIX: Water/Soil

SAMPLING INFO

REMARKS

RECEIVED IN  
GOOD CONDITION

DATE

TIME

7-24-92

Sample Server

63793

63788

64345

64345

64343

64343

50554

50554

50554

50554

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50554

50554

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50554

50554

RELINQUISHED BY: *Tammy Tusk*

DATE/TIME: 7-25-92

COMPANY NAME: Earle Technology

RECEIVED BY: *Reginald Benthon*

DATE/TIME: 7/27/92

COMPANY NAME: COMPUCHEM

RELINQUISHED BY: *Reginald Benthon*

DATE/TIME: 9/10/92

COMPANY NAME: COMPUCHEM

RELINQUISHED BY:

COMPANY NAME:

RECEIVED BY:

COMPANY NAME:

RELINQUISHED BY:

COMPANY NAME:

RELINQUISHED BY:

COMPANY NAME:

RELINQUISHED BY:

COMPANY NAME:

RECEIVED BY:

COMPANY NAME:

RELINQUISHED BY:

COMPANY NAME:

RELINQUISHED BY:

COMPANY NAME:

SHIPPING INFORMATION

Number of Shipping Containers: 4

Method of Shipment: Fedex Airbill Nos.

4512476651, 4512476640

4512476639, 4512476628

Special Handling Requirements





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**APPENDIX F**  
**LABORATORY ANALYTICAL RESULTS**

**TABLE F-1  
SOIL SAMPLING RESULTS  
VOLATILE ORGANIC ANALYTES**

Page 1 of 5

Soil Boring No. Sample No.	SB1 09	SB1 09RE	SB1 11	SB1 11RE	SB1 15	SB2 05	SB2 05RE
Sampling Depth (ft bls)	20-21.5	20-21.5	25-26.5	25-26.5	35-36.5	10-11.5	10-11.5
Percent Moisture	2	2	4	4	9	3	3
Sampling Date	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)						
Chloromethane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Bromomethane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Vinyl Chloride	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Chloroethane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Methylene Chloride	19 B	110 BD	68 B	2,100 BD	18 B	54 B	2,700 BD
Acetone	320 BE	280 BD	4,000 BE	4,700 D	29 B	1,200 BE	2,200 BD
Carbon Disulfide	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
1,1-Dichloroethene	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
1,1-Dichloroethane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
1,2-Dichloroethene (total)	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Chloroform	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
1,2-Dichloroethane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
2-Butanone	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
1,1,1-Trichloroethane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Carbon Tetrachloride	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Bromodichloromethane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
1,2-Dichloropropane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
cis-1,3-Dichloropropene	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Trichloroethene	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Dibromochloromethane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
1,1,2-Trichloroethane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Benzene	2 BJ	20 U	1 BJ	1,300 U	2 BJ	1 BJ	1,200 U
Trans-1,3-Dichloropropene	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Bromoform	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
4-Methyl-2-Pentanone	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
2-Hexanone	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Tetrachloroethene	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
1,1,2,2-Tetrachloroethane	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Toluene	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Chlorobenzene	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Ethylbenzene	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Styrene	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U
Xylene (total)	10 U	20 U	10 U	1,300 U	11 U	10 U	1,200 U

U - Compound was analyzed for but not detected above the sample Quantitation Limit given  
 B - Not detected substantially above level reported in laboratory or field blanks  
 D - Compound identified after secondary dilution  
 E - Concentration exceeds the calibration range of the instrument  
 J - Indicates that analyte was present but reported value not accurate or precise

**TABLE F-1**  
**SOIL SAMPLING RESULTS**  
**VOLATILE ORGANIC ANALYTES**

Page 2 of 5

Soil Boring No.	SB2	SB2	SB2	EB1	TB1	TB2
Sample No.	09	09RE	15			
Sampling Depth (ft bis)	20-21.5	20-21.5	35-36.5	(ug/L)	(ug/L)	(ug/L)
Percent Moisture	5	5	17			
Sampling Date	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92
<b>ANALYTE</b>						
Chloromethane	11 U	21 U	12 U	10 U	10 U	10 U
Bromomethane	11 U	21 U	12 U	10 U	10 U	10 U
Vinyl Chloride	11 U	21 U	12 U	10 U	10 U	10 U
Chloroethane	11 U	21 U	12 U	10 U	10 U	10 U
Methylene Chloride	31 B	75 BD	32 B	26 B	26 B	5 BJ
Acetone	340 BE	91 BD	75 B	10 U	10 U	10 U
Carbon Disulfide	11 U	21 U	12 U	10 U	10 U	10 U
1,1-Dichloroethene	11 U	21 U	12 U	10 U	10 U	10 U
1,1-Dichloroethane	11 U	21 U	12 U	10 U	10 U	10 U
1,2-Dichloroethene (total	11 U	21 U	12 U	10 U	10 U	10 U
Chloroform	11 U	21 U	12 U	10 U	10 U	10 U
1,2-Dichloroethane	11 U	21 U	12 U	10 U	10 U	10 U
2-Butanone	11 U	21 U	12 U	10 U	10 U	10 U
1,1,1-Trichloroethane	11 U	21 U	12 U	10 U	10 U	10 U
Carbon Tetrachloride	11 U	21 U	12 U	10 U	10 U	10 U
Bromodichloromethane	11 U	21 U	12 U	10 U	10 U	10 U
1,2-Dichloropropane	11 U	21 U	12 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	11 U	21 U	12 U	10 U	10 U	10 U
Trichloroethene	11 U	21 U	12 U	10 U	10 U	10 U
Dibromochloromethane	11 U	21 U	12 U	10 U	10 U	10 U
1,1,2-Trichloroethane	11 U	21 U	12 U	10 U	10 U	10 U
Benzene	2 BJ	21 U	2 BJ	10 U	10 U	10 U
Trans-1,3-Dichloroprop	11 U	21 U	12 U	10 U	10 U	10 U
Bromoform	11 U	21 U	12 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	11 U	21 U	12 U	10 U	10 U	10 U
2-Hexanone	11 U	21 U	12 U	10 U	10 U	10 U
Tetrachloroethene	11 U	21 U	12 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethan	11 U	21 U	12 U	10 U	10 U	10 U
Toluene	11 U	21 U	12 U	10 U	10 U	10 U
Chlorobenzene	11 U	21 U	12 U	10 U	10 U	10 U
Ethylbenzene	11 U	21 U	12 U	10 U	10 U	10 U
Styrene	11 U	21 U	12 U	10 U	10 U	10 U
Xylene (total)	11 U	21 U	12 U	10 U	10 U	10 U

U - Compound was analyzed for but not detected above the sample Quantitation Limit given  
 B - Not detected substantially above level reported in laboratory or field blanks  
 D - Compound identified after secondary dilution  
 E - Concentration exceeds the calibration range of the instrument  
 J - Indicates that analyte was present but reported value not accurate or precise

**TABLE F-1**  
**SOIL SAMPLING RESULTS**  
**VOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB3	SB3	SB3	SB3	SB4	SB4	SB4
Sample No.	04	04RE	06	07	05	05RE	08
Sampling Depth (ft bls)	22-23.5	22-23.5	35-36.5	37.5-39	10-11.5	10-11.5	20-21.5
Percent Moisture	9	9	7	11	3	3	5
Sampling Date	6-16-92	6-16-92	6-16-92	6-16-92	6-16-92	6-16-92	6-16-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)						
Chloromethane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Bromomethane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Vinyl Chloride	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Chloroethane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Methylene Chloride	64 B	4,100 BD	12 B	13 B	19 B	4,400 BD	23 B
Acetone	5,600 BE	6,200 BD	94 B	20 B	3,600 BE	2,500 BD	50 B
Carbon Disulfide	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
1,1-Dichloroethene	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
1,1-Dichloroethane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
1,2-Dichloroethene (total)	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Chloroform	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
1,2-Dichloroethane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
2-Butanone	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
1,1,1-Trichloroethane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Carbon Tetrachloride	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Bromodichloromethane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
1,2-Dichloropropane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
cis-1,3-Dichloropropene	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Trichloroethene	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Dibromochloromethane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
1,1,2-Trichloroethane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Benzene	2 BJ	1,300 U	1 BJ	11 U	2 BJ	1,200 U	2 BJ
Trans-1,3-Dichloropropene	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Bromoform	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
4-Methyl-2-Pentanone	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
2-Hexanone	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Tetrachloroethene	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
1,1,2,2-Tetrachloroethane	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Toluene	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Chlorobenzene	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Ethylbenzene	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Styrene	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U
Xylene (total)	11 U	1,300 U	11 U	11 U	10 U	1,200 U	11 U

U - Compound was analyzed for but not detected above the sample Quantitation Limit given  
 B - Not detected substantially above level reported in laboratory or field blanks  
 D - Compound identified after secondary dilution  
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**TABLE F-1  
SOIL SAMPLING RESULTS  
VOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB4	SB5	SB5	SB5	SB6	SB6
Sample No.	14	05	09	15	04	07
Sampling Depth (ft bis)	35-36.5	10-11.5	20-21.5	35-36.5	10-11.5	17.5-19
Percent Moisture	10	7	6	3	9	8
Sampling Date	6-16-92	6-16-92	6-16-92	6-16-92	6-17-92	6-17-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)					
Chloromethane	11 U	11 U	11 U	10 U	11 U	11 U
Bromomethane	11 U	11 U	11 U	10 U	11 U	11 U
Vinyl Chloride	11 U	11 U	11 U	10 U	11 U	11 U
Chloroethane	11 U	11 U	11 U	10 U	11 U	11 U
Methylene Chloride	27 B	30 B	42 B	17 B	66 B	65 B
Acetone	82 B	38 B	32	59 B	110 B	25 B
Carbon Disulfide	11 U	11 U	11 U	10 U	11 U	11 U
1,1-Dichloroethene	11 U	11 U	11 U	10 U	11 U	11 U
1,1-Dichloroethane	11 U	11 U	11 U	10 U	11 U	11 U
1,2-Dichloroethene (total)	11 U	11 U	11 U	10 U	11 U	11 U
Chloroform	11 U	11 U	11 U	10 U	11 U	11 U
1,2-Dichloroethane	11 U	11 U	11 U	10 U	11 U	11 U
2-Butanone	11 U	11 U	11 U	10 U	11 U	11 U
1,1,1-Trichloroethane	11 U	11 U	11 U	10 U	11 U	11 U
Carbon Tetrachloride	11 U	11 U	11 U	10 U	11 U	11 U
Bromodichloromethane	11 U	11 U	11 U	10 U	11 U	11 U
1,2-Dichloropropane	11 U	11 U	11 U	10 U	11 U	11 U
cis-1,3-Dichloropropene	11 U	11 U	11 U	10 U	11 U	11 U
Trichloroethene	11 U	11 U	11 U	10 U	11 U	11 U
Dibromochloromethane	11 U	11 U	11 U	10 U	11 U	11 U
1,1,2-Trichloroethane	11 U	11 U	11 U	10 U	11 U	11 U
Benzene	2 BJ	11 U	11 U	10 U	11 U	11 U
Trans-1,3-Dichloropropene	11 U	11 U	11 U	10 U	11 U	11 U
Bromoform	11 U	11 U	11 U	10 U	11 U	11 U
4-Methyl-2-Pentanone	11 U	11 U	11 U	10 U	11 U	11 U
2-Hexanone	11 U	11 U	11 U	10 U	11 U	11 U
Tetrachloroethene	11 U	11 U	11 U	10 U	11 U	11 U
1,1,2,2-Tetrachloroethane	11 U	11 U	11 U	10 U	11 U	11 U
Toluene	11 U	11 U	11 U	10 U	11 U	11 U
Chlorobenzene	11 U	11 U	11 U	10 U	11 U	11 U
Ethylbenzene	11 U	11 U	11 U	10 U	11 U	11 U
Styrene	11 U	11 U	11 U	10 U	11 U	11 U
Xylene (total)	11 U	11 U	11 U	10 U	11 U	11 U

U - Compound was analyzed for but not detected above the sample Quantitation Limit given  
 B - Not detected substantially above level reported in laboratory or field blanks  
 D - Compound identified after secondary dilution  
 E - Concentration exceeds the calibration range of the instrument  
 J - Indicates that analyte was present but reported value not accurate or precise

**TABLE F-1  
SOIL SAMPLING RESULTS  
VOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB6	SB6	SB6	SB6	EB2	FB1	FB2
Sample No.	12	14	15	16			
Sampling Depth (ft bls)	30-31.5	35-36.5	35-36.5	30-31.5	(ug/L)	(ug/L)	(ug/L)
Percent Moisture	5	14	17	16			
Sampling Date	6-17-92	6-17-92	6-17-92	6-17-92	6-17-92	6-17-92	6-17-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)						
Chloromethane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Bromomethane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Vinyl Chloride	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Chloroethane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Methylene Chloride	30 B	48 B	73 B	28 B	25 B	7 BJ	40 B
Acetone	29 B	30 B	97 B	34 B	10 U	10 U	10 U
Carbon Disulfide	11 U	12 U	12 U	12 U	10 U	10 U	10 U
1,1-Dichloroethene	11 U	12 U	12 U	12 U	10 U	10 U	10 U
1,1-Dichloroethane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Chloroform	11 U	12 U	12 U	12 U	10 U	10 U	10 U
1,2-Dichloroethane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
2-Butanone	11 U	12 U	12 U	12 U	10 U	10 U	10 U
1,1,1-Trichloroethane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Carbon Tetrachloride	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Bromodichloromethane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
1,2-Dichloropropane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Trichloroethene	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Dibromochloromethane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
1,1,2-Trichloroethane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Benzene	11 U	12 U	12 U	12 U	2 J	10 U	10 U
Trans-1,3-Dichloropropene	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Bromoform	11 U	12 U	12 U	12 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	11 U	12 U	12 U	12 U	10 U	10 U	10 U
2-Hexanone	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Tetrachloroethene	11 U	12 U	12 U	12 U	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Toluene	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Chlorobenzene	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Ethylbenzene	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Styrene	11 U	12 U	12 U	12 U	10 U	10 U	10 U
Xylene (total)	11 U	12 U	12 U	12 U	10 U	10 U	10 U

U - Compound was analyzed for but not detected above the sample Quantitation Limit given

B - Not detected substantially above level reported in laboratory or field blanks

D - Compound identified after secondary dilution

E - Concentration exceeds the calibration range of the instrument

J - Indicates that analyte was present but reported value not accurate or precise



**TABLE F-2**  
**SOIL SAMPLING RESULTS**  
**SEMIVOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB1	SB1	SB1	SB2	SB2	SB2	
Sample No.	09	11	15	05	09	15	EB1
Sampling Depth (ft bis)	20-21.5	25-26.5	35-36.5	10-11.5	20-21.5	35-36.5	(ug/L)
Percent Moisture	2	4	9	3	5	17	
Sampling Date	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92
ANALYTE							
ANALYTE CONCENTRATIONS DETECTED (ug/kg)							
Phenol	330 U	340 U	360 U	340 U	340 U	390 U	10 U
bis (2-Chloroethyl) Ether	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2-Chlorophenol	330 U	340 U	360 U	340 U	340 U	390 U	10 U
1,3-Dichlorobenzene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
1,4-Dichlorobenzene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
1,2-Dichlorobenzene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2-Methylphenol	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2,2'-Oxybis (1-Chloropropane)	330 U	340 U	360 U	340 U	340 U	390 U	10 U
4-Methylphenol	330 U	340 U	360 U	340 U	340 U	390 U	10 U
N-Nitroso-Di-n-Propylamine	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Hexachloroethane	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Nitrobenzene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Isophorone	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2-Nitrophenol	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2,4-Dimethylphenol	330 U	340 U	360 U	340 U	340 U	390 U	10 U
bis (2-Chloroethoxy) Methane	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2,4-Dichlorophenol	330 U	340 U	360 U	340 U	340 U	390 U	10 U
1,2,4-Trichlorobenzene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Naphthalene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
4-Chloroaniline	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Hexachlorobutadiene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
4-Chloro-3-Methylphenol	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2-Methylnaphthalene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Hexachlorocyclopentadiene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2,4,6-Trichlorophenol	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2,4,5-Trichlorophenol	810 U	830 U	870 U	820 U	830 U	950 U	25 U
2-Chloronaphthalene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2-Nitroaniline	810 U	830 U	870 U	820 U	830 U	950 U	25 U
Dimethyl Phthalate	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Acenaphthylene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2,6-Dinitrotoluene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
3-Nitroaniline	810 U	830 U	870 U	820 U	830 U	950 U	25 U
Acenaphthene	330 U	340 U	360 U	340 U	340 U	390 U	10 U

U - Compound was analyzed for but not detected above the sample quantitation limit given

**Table F-2**  
**SOIL SAMPLING RESULTS**  
**SEMIVOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB3	SB3	SB3	SB4	SB4	SB4
Sample No.	04	06	07	05	08	14
Sampling Depth (ft bls)	22-23.5	35-36.5	37.5-39	10-11.5	20-21.5	35-36.5
Percent Moisture	9	7	11	3	5	10
Sampling Date	6-16-92	6-16-92	6-16-92	6-16-92	6-16-92	6-16-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)					
Phenol	360 U	350 U	370 U	340 U	340 U	360 U
bis (2-Chloroethyl) Ether	360 U	350 U	370 U	340 U	340 U	360 U
2-Chlorophenol	360 U	350 U	370 U	340 U	340 U	360 U
1,3-Dichlorobenzene	360 U	350 U	370 U	340 U	340 U	360 U
1,4-Dichlorobenzene	360 U	350 U	370 U	340 U	340 U	360 U
1,2-Dichlorobenzene	360 U	350 U	370 U	340 U	340 U	360 U
2-Methylphenol	360 U	350 U	370 U	340 U	340 U	360 U
2,2'-Oxybis (1-Chloropropane)	360 U	350 U	370 U	340 U	340 U	360 U
4-Methylphenol	360 U	350 U	370 U	340 U	340 U	360 U
N-Nitroso-Di-n-Propylamine	360 U	350 U	370 U	340 U	340 U	360 U
Hexachloroethane	360 U	350 U	370 U	340 U	340 U	360 U
Nitrobenzene	360 U	350 U	370 U	340 U	340 U	360 U
Isophorone	360 U	350 U	370 U	340 U	340 U	360 U
2-Nitrophenol	360 U	350 U	370 U	340 U	340 U	360 U
2,4-Dimethylphenol	360 U	350 U	370 U	340 U	340 U	360 U
bis (2-Chloroethoxy) Methane	360 U	350 U	370 U	340 U	340 U	360 U
2,4-Dichlorophenol	360 U	350 U	370 U	340 U	340 U	360 U
1,2,4-Trichlorobenzene	360 U	350 U	370 U	340 U	340 U	360 U
Naphthalene	360 U	350 U	370 U	340 U	340 U	360 U
4-Chloroaniline	360 U	350 U	370 U	340 U	340 U	360 U
Hexachlorobutadiene	360 U	350 U	370 U	340 U	340 U	360 U
4-Chloro-3-Methylphenol	360 U	350 U	370 U	340 U	340 U	360 U
2-Methylnaphthalene	360 U	350 U	370 U	340 U	340 U	360 U
Hexachlorocyclopentadiene	360 U	350 U	370 U	340 U	340 U	360 U
2,4,6-Trichlorophenol	360 U	350 U	370 U	340 U	340 U	360 U
2,4,5-Trichlorophenol	870 U	850 U	890 U	820 U	830 U	880 U
2-Chloronaphthalene	360 U	350 U	370 U	340 U	340 U	360 U
2-Nitroaniline	870 U	850 U	890 U	820 U	830 U	880 U
Dimethyl Phthalate	360 U	350 U	370 U	340 U	340 U	360 U
Acenaphthylene	360 U	350 U	370 U	340 U	340 U	360 U
2,6-Dinitrotoluene	360 U	350 U	370 U	340 U	340 U	360 U
3-Nitroaniline	870 U	850 U	890 U	820 U	830 U	880 U
Acenaphthene	360 U	350 U	370 U	340 U	340 U	360 U

U - Compound was analyzed for but not detected above the sample quantitation limit given

**Table F-2**  
**SOIL SAMPLING RESULTS**  
**SEMIVOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB5	SB5	SB5	SB6	SB6
Sample No.	05	09	15	04	07
Sampling Depth (ft bls)	10-11.5	20-21.5	35-36.5	10-11.5	17.5-19
Percent Moisture	7	6	3	9	8
Sampling Date	6-16-92	6-16-92	6-16-92	6-17-92	6-17-92

ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)				
Phenol	350 U	350 U	340 U	350 U	360 U
bis (2-Chloroethyl) Ether	350 U	350 U	340 U	350 U	360 U
2-Chlorophenol	350 U	350 U	340 U	350 U	360 U
1,3-Dichlorobenzene	350 U	350 U	340 U	350 U	360 U
1,4-Dichlorobenzene	350 U	350 U	340 U	350 U	360 U
1,2-Dichlorobenzene	350 U	350 U	340 U	350 U	360 U
2-Methylphenol	350 U	350 U	340 U	350 U	360 U
2,2'-Oxybis (1-Chloropropane)	350 U	350 U	340 U	350 U	360 U
4-Methylphenol	350 U	350 U	340 U	350 U	360 U
N-Nitroso-Di-n-Propylamine	350 U	350 U	340 U	350 U	360 U
Hexachloroethane	350 U	350 U	340 U	350 U	360 U
Nitrobenzene	350 U	350 U	340 U	350 U	360 U
Isophorone	350 U	350 U	340 U	350 U	360 U
2-Nitrophenol	350 U	350 U	340 U	350 U	360 U
2,4-Dimethylphenol	350 U	350 U	340 U	350 U	360 U
bis (2-Chloroethoxy) Methane	350 U	350 U	340 U	350 U	360 U
2,4-Dichlorophenol	350 U	350 U	340 U	350 U	360 U
1,2,4-Trichlorobenzene	350 U	350 U	340 U	350 U	360 U
Naphthalene	350 U	350 U	340 U	350 U	360 U
4-Chloroaniline	350 U	350 U	340 U	350 U	360 U
Hexachlorobutadiene	350 U	350 U	340 U	350 U	360 U
4-Chloro-3-Methylphenol	350 U	350 U	340 U	350 U	360 U
2-Methylnaphthalene	350 U	350 U	340 U	350 U	360 U
Hexachlorocyclopentadiene	350 U	350 U	340 U	350 U	360 U
2,4,6-Trichlorophenol	350 U	350 U	340 U	350 U	360 U
2,4,5-Trichlorophenol	850 U	840 U	820 U	860 U	860 U
2-Chloronaphthalene	350 U	350 U	340 U	350 U	360 U
2-Nitroaniline	850 U	840 U	820 U	860 U	860 U
Dimethyl Phthalate	350 U	350 U	340 U	350 U	360 U
Acenaphthylene	350 U	350 U	340 U	350 U	360 U
2,6-Dinitrotoluene	350 U	350 U	340 U	350 U	360 U
3-Nitroaniline	850 U	840 U	820 U	860 U	860 U
Acenaphthene	350 U	350 U	340 U	350 U	360 U

U - Compound was analyzed for but not detected above the sample quantitation limit given

**Table F-2**  
**SOIL SAMPLING RESULTS**  
**SEMIVOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB6	SB6	SB6	SB6	EB2	FB1
Sample No.	12	14	15	16	(ug/L)	(ug/L)
Sampling Depth (ft bis)	30-31.5	35-36.5	35-36.5	30-31.5		
Percent Moisture	5	14	17	16		
Sampling Date	6-17-92	6-17-92	6-17-92	6-17-92	6-17-92	6-17-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)					
Phenol	340 U	370 U	390 U	380 U	1 B J	2 B J
bis (2-Chloroethyl) Ether	340 U	370 U	390 U	380 U	10 U	10 U
2-Chlorophenol	340 U	370 U	390 U	380 U	10 U	10 U
1,3-Dichlorobenzene	340 U	370 U	390 U	380 U	10 U	10 U
1,4-Dichlorobenzene	340 U	370 U	390 U	380 U	10 U	10 U
1,2-Dichlorobenzene	340 U	370 U	390 U	380 U	10 U	10 U
2-Methylphenol	340 U	370 U	390 U	380 U	10 U	10 U
2,2'-Oxybis (1-Chloropropane)	340 U	370 U	390 U	380 U	10 U	10 U
4-Methylphenol	340 U	370 U	390 U	380 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	340 U	370 U	390 U	380 U	10 U	10 U
Hexachloroethane	340 U	370 U	390 U	380 U	10 U	10 U
Nitrobenzene	340 U	370 U	390 U	380 U	10 U	10 U
Isophorone	340 U	370 U	390 U	380 U	10 U	10 U
2-Nitrophenol	340 U	370 U	390 U	380 U	10 U	10 U
2,4-Dimethylphenol	340 U	370 U	390 U	380 U	10 U	10 U
bis (2-Chloroethoxy) Methane	340 U	370 U	390 U	380 U	10 U	10 U
2,4-Dichlorophenol	340 U	370 U	390 U	380 U	10 U	10 U
1,2,4-Trichlorobenzene	340 U	370 U	390 U	380 U	10 U	10 U
Naphthalene	340 U	370 U	390 U	380 U	10 U	10 U
4-Chloroaniline	340 U	370 U	390 U	380 U	10 U	10 U
Hexachlorobutadiene	340 U	370 U	390 U	380 U	10 U	10 U
4-Chloro-3-Methylphenol	340 U	370 U	390 U	380 U	10 U	10 U
2-Methylnaphthalene	340 U	370 U	390 U	380 U	10 U	10 U
Hexachlorocyclopentadiene	340 U	370 U	390 U	380 U	10 U	10 U
2,4,6-Trichlorophenol	340 U	370 U	390 U	380 U	10 U	10 U
2,4,5-Trichlorophenol	820 U	910 U	950 U	930 U	25 U	25 U
2-Chloronaphthalene	340 U	370 U	390 U	380 U	10 U	10 U
2-Nitroaniline	820 U	910 U	950 U	980 U	25 U	25 U
Dimethyl Phthalate	340 U	370 U	390 U	380 U	10 U	10 U
Acenaphthylene	340 U	370 U	390 U	380 U	10 U	10 U
2,6-Dinitrotoluene	340 U	370 U	390 U	380 U	10 U	10 U
3-Nitroaniline	820 U	910 U	950 U	930 U	25 U	25 U
Acenaphthene	340 U	370 U	390 U	380 U	10 U	10 U

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J - Indicates that compound was present, but reported value not accurate or precise

B - Not detected substantially above level reported in field or laboratory blanks

**Table F-2**  
**SOIL SAMPLING RESULTS**  
**SEMIVOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB1	SB1	SB1	SB2	SB2	SB2	
Sample No.	09	11	15	05	09	15	EB1
Sampling Depth (ft)	20-21.5	25-26.5	35-36.5	10-11.5	20-21.5	35-36.5	(ug/L)
Percent Moisture	2	4	9	3	5	17	
Sampling Date	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)						
2,4-Dinitrophenol	810 U	830 U	870 U	820 U	830 U	950 U	25 U
4-Nitrophenol	810 U	830 U	870 U	820 U	830 U	950 U	25 U
Dibenzofuran	330 U	340 U	360 U	340 U	340 U	390 U	10 U
2,4-Dinitrotoluene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Diethylphthalate	330 U	340 U	360 U	340 U	340 U	390 U	10 U
4-Chlorophenyl-phenylether	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Fluorene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
4-Nitroaniline	810 U	830 U	870 U	820 U	830 U	950 U	25 U
4,6-Dinitro-2-Methylphenol	810 U	830 U	870 U	820 U	830 U	950 U	25 U
N-Nitrosodiphenylamine (1)	330 U	340 U	360 U	340 U	340 U	390 U	10 U
4-Bromophenyl-phenylether	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Hexachlorobenzene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Pentachlorophenol	810 U	830 U	870 U	820 U	830 U	950 U	25 U
Phenanthrene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Anthracene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Carbazole	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Di-n-Butylphthalate	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Fluoranthene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Pyrene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Butylbenzylphthalate	330 U	340 U	360 U	340 U	340 U	390 U	10 U
3,3'-Dichlorobenzidine	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Benzo (a) Anthracene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Chrysene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
bis (2-Ethylhexyl) Phthalate	330 U	340 U	360 U	340 U	340 U	390 U	4 B J
Di-n-Octyl Phthalate	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Benzo (b) Fluoranthene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Benzo (k) Fluoranthene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Benzo (a) Pyrene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Indeno (1,2,3-cd) Pyrene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Dibenz (a,h) Anthracene	330 U	340 U	360 U	340 U	340 U	390 U	10 U
Benzo (g,h,i) Perylene	330 U	340 U	360 U	340 U	340 U	390 U	10 U

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**Table F-2**  
**SOIL SAMPLING RESULTS**  
**SEMIVOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB3	SB3	SB3	SB4	SB4	SB4
Sample No.	04	06	07	05	08	14
Sampling Depth (ft)	22-23.5	35-36.5	37.5-39	10-11.5	20-21.5	35-36.5
Percent Moisture	9	7	11	3	5	10
Sampling Date	6-16-92	6-16-92	6-16-92	6-16-92	6-16-92	6-16-92

ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)					
2,4-Dinitrophenol	870 U	850 U	890 U	820 U	830 U	880 U
4-Nitrophenol	870 U	850 U	890 U	820 U	830 U	880 U
Dibenzofuran	360 U	350 U	370 U	340 U	340 U	360 U
2,4-Dinitrotoluene	360 U	350 U	370 U	340 U	340 U	360 U
Diethylphthalate	360 U	350 U	370 U	340 U	340 U	360 U
4-Chlorophenyl-phenylether	360 U	350 U	370 U	340 U	340 U	360 U
Fluorene	360 U	350 U	370 U	340 U	340 U	360 U
4-Nitroaniline	870 U	850 U	890 U	820 U	830 U	880 U
4,6-Dinitro-2-Methylphenol	870 U	850 U	890 U	820 U	830 U	880 U
N-Nitrosodiphenylamine (1)	360 U	350 U	370 U	340 U	340 U	360 U
4-Bromophenyl-phenylether	360 U	350 U	370 U	340 U	340 U	360 U
Hexachlorobenzene	360 U	350 U	370 U	340 U	340 U	360 U
Pentachlorophenol	870 U	850 U	890 U	820 U	830 U	880 U
Phenanthrene	360 U	350 U	370 U	340 U	340 U	360 U
Anthracene	360 U	350 U	370 U	340 U	340 U	360 U
Carbazole	360 U	350 U	370 U	340 U	340 U	360 U
Di-n-Butylphthalate	360 U	350 U	370 U	340 U	340 U	360 U
Fluoranthene	360 U	350 U	370 U	340 U	340 U	360 U
Pyrene	360 U	350 U	370 U	340 U	340 U	360 U
Butylbenzylphthalate	360 U	350 U	370 U	340 U	340 U	360 U
3,3'-Dichlorobenzidine	360 U	350 U	370 U	340 U	340 U	360 U
Benzo (a) Anthracene	360 U	350 U	370 U	340 U	340 U	360 U
Chrysene	360 U	350 U	370 U	340 U	340 U	360 U
bis (2-Ethylhexyl) Phthalate	45 J	350 U	370 U	920	340 U	360 U
Di-n-Octyl Phthalate	360 U	350 U	370 U	340 U	340 U	360 U
Benzo (b) Fluoranthene	360 U	350 U	370 U	340 U	340 U	360 U
Benzo (k) Fluoranthene	360 U	350 U	370 U	340 U	340 U	360 U
Benzo (a) Pyrene	360 U	350 U	370 U	340 U	340 U	360 U
Indeno (1,2,3-cd) Pyrene	360 U	350 U	370 U	340 U	340 U	360 U
Dibenz (a,h) Anthracene	360 U	350 U	370 U	340 U	340 U	360 U
Benzo (g,h,i) Perylene	360 U	350 U	370 U	340 U	340 U	360 U

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**Table F-2**  
**SOIL SAMPLING RESULTS**  
**SEMIVOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB5	SB5	SB5	SB6	SB6
Sample No.	05	09	15	04	07
Sampling Depth (ft)	10-11.5	20-21.5	35-36.5	10-11.5	17.5-19
Percent Moisture	7		3	9	8
Sampling Date	6-16-92	6-16-92	6-16-92	6-17-92	6-17-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)				
2,4-Dinitrophenol	850 U	840 U	820 U	860 U	860 U
4-Nitrophenol	850 U	840 U	820 U	860 U	860 U
Dibenzofuran	350 U	350 U	340 U	350 U	360 U
2,4-Dinitrotoluene	350 U	350 U	340 U	350 U	360 U
Diethylphthalate	350 U	350 U	340 U	350 U	360 U
4-Chlorophenyl-phenylether	350 U	350 U	340 U	350 U	360 U
Fluorene	350 U	350 U	340 U	350 U	360 U
4-Nitroaniline	850 U	840 U	820 U	860 U	860 U
4,6-Dinitro-2-Methylphenol	850 U	840 U	820 U	860 U	860 U
N-Nitrosodiphenylamine (1)	350 U	350 U	340 U	350 U	360 U
4-Bromophenyl-phenylether	350 U	350 U	340 U	350 U	360 U
Hexachlorobenzene	350 U	350 U	340 U	350 U	360 U
Pentachlorophenol	850 U	840 U	820 U	860 U	860 U
Phenanthrene	350 U	350 U	340 U	350 U	360 U
Anthracene	350 U	350 U	340 U	350 U	360 U
Carbazole	350 U	350 U	340 U	350 U	360 U
Di-n-Butylphthalate	350 U	350 U	340 U	350 U	41 J
Fluoranthene	350 U	350 U	340 U	350 U	360 U
Pyrene	350 U	350 U	340 U	350 U	360 U
Butylbenzylphthalate	350 U	350 U	340 U	350 U	360 U
3,3'-Dichlorobenzidine	350 U	350 U	340 U	350 U	360 U
Benzo (a) Anthracene	350 U	350 U	340 U	350 U	360 U
Chrysene	350 U	350 U	340 U	350 U	360 U
bis (2-Ethylhexyl) Phthalate	350 U	120 J	340 U	350 U	50 J
Di-n-Octyl Phthalate	350 U	350 U	340 U	350 U	360 U
Benzo (b) Fluoranthene	350 U	350 U	340 U	350 U	360 U
Benzo (k) Fluoranthene	350 U	350 U	340 U	350 U	360 U
Benzo (a) Pyrene	350 U	350 U	340 U	350 U	360 U
Indeno (1,2,3-cd) Pyrene	350 U	350 U	340 U	350 U	360 U
Dibenz (a,h) Anthracene	350 U	350 U	340 U	350 U	360 U
Benzo (g,h,i) Perylene	350 U	350 U	340 U	350 U	360 U

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J - Indicates that compound was present, but reported value not accurate or precise

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**Table F-2**  
**SOIL SAMPLING RESULTS**  
**SEMIVOLATILE ORGANIC ANALYTES**

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Soil Boring No.	SB6	SB6	SB6	SB6	EB2	FB1
Sample No.	12	14	15	16	(ug/L)	(ug/L)
Sampling Depth (ft)	30-31.5	35-36.5	35-36.5	30-31.5		
Percent Moisture	5	14	17	16		
Sampling Date	6-17-92	6-17-92	6-17-92	6-17-92	6-17-92	6-17-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/kg)					
2,4-Dinitrophenol	820 U	910 U	950 U	930	25 U	25 U
4-Nitrophenol	820 U	910 U	950 U	930	25 U	25 U
Dibenzofuran	340 U	370 U	390 U	380	10 U	10 U
2,4-Dinitrotoluene	340 U	370 U	390 U	380	10 U	10 U
Diethylphthalate	340 U	370 U	390 U	380	2 BJ	2 BJ
4-Chlorophenyl-phenylether	340 U	370 U	390 U	380	10 U	10 U
Fluorene	340 U	370 U	390 U	380	10 U	10 U
4-Nitroaniline	820 U	910 U	950 U	930	25 U	25 U
4,6-Dinitro-2-Methylphenol	820 U	910 U	950 U	930	25 U	25 U
N-Nitrosodiphenylamine (1)	340 U	370 U	390 U	380	10 U	10 U
4-Bromophenyl-phenylether	340 U	370 U	390 U	380	10 U	10 U
Hexachlorobenzene	340 U	370 U	390 U	380	10 U	10 U
Pentachlorophenol	820 U	910 U	950 U	930	25 U	25 U
Phenanthrene	340 U	370 U	390 U	380	10 U	10 U
Anthracene	340 U	370 U	390 U	380	10 U	10 U
Carbazole	340 U	370 U	390 U	380	10 U	10 U
Di-n-Butylphthalate	340 U	370 U	390 U	380	10 U	10 U
Fluoranthene	340 U	370 U	390 U	380	10 U	10 U
Pyrene	340 U	370 U	390 U	380	10 U	10 U
Butylbenzylphthalate	340 U	370 U	390 U	380	10 U	10 U
3,3'-Dichlorobenzidine	340 U	370 U	390 U	380	10 U	10 U
Benzo (a) Anthracene	340 U	370 U	390 U	380	10 U	10 U
Chrysene	340 U	370 U	390 U	380	10 U	10 U
bis (2-Ethylhexyl) Phthalate	340 U	370 U	390 U	380	4 BJ	9 BJ
Di-n-Octyl Phthalate	340 U	370 U	390 U	380	10 U	10 U
Benzo (b) Fluoranthene	340 U	370 U	390 U	380	10 U	10 U
Benzo (k) Fluoranthene	340 U	370 U	390 U	380	10 U	10 U
Benzo (a) Pyrene	340 U	370 U	390 U	380	10 U	10 U
Indeno (1,2,3-cd) Pyrene	340 U	370 U	390 U	380	10 U	10 U
Dibenz (a,h) Anthracene	340 U	370 U	390 U	380	10 U	10 U
Benzo (g,h,i) Perylene	340 U	370 U	390 U	380	10 U	10 U

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J - Indicates that compound was present, but reported value not accurate or precise

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**TABLE F-3**  
**SOIL SAMPLING RESULTS**  
**INORGANIC ANALYTES**

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Soil Boring No.	SB1	SB1	SB1	SB2	SB2	SB2	
Sample No.	09	11	15	05	09	15	EB1
Sampling Depth (ft bls)	20-21.5	25-26.5	35-36.5	10-11.5	20-21.5	35-36.5	(ug/L)
Percent Solids	98.1	96.1	90.9	96.9	94.8	82.5	
Sampling Date	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92	6-15-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (mg/kg)						
Aluminum	5,630	6,920	17,700	6,790	10,200	10,900	97.5 B
Antimony	4.2 U	4.3 U	4.5 U	4.2 U	4.3 U	5.0 U	54.0 U
Arsenic	1.4	1.6	9.6	0.79 B	2.0	2.7	3.0 U
Barium	49.1	64.3	160	68.0	108	111	2.0 U
Beryllium	0.22 B	0.23 B	0.62	0.23 B	0.43 B	0.46 B	1.0 U
Cadmium	0.51 U	0.52 U	0.55 U	0.52 U	0.53 U	0.61 U	5.0 U
Calcium	2,580	2,690	6,060	3,000	2,430	3,660	48.3 B
Chromium	7.2	7.9	22.7	11.8	20.4	12.9	7.0 U
Cobalt	4.4 B	5.3	10.3	5.0 B	5.0 B	7.8	9.0 U
Copper	5.6	6.8	19.0	8.5	14.3	10.5	9.0 U
Iron	8,940	11,500	22,200	10,700	16,200	14,200	102
Lead	1.9	1.6	5.9	2.8	2.2	2.8	2.0 U
Magnesium	2,910	2,930	7,220	3,490	3,250	4,670	70 U
Manganese	137	117	564	137	87.8	221	2.0 U
Mercury	0.10 U	0.10 U	0.11 U	0.10 U	0.11 U	0.12 U	0.20 U
Nickel	4.9	4.7	12.5	5.0	7.5	7.1	12.0 U
Potassium	940	1,730	3,770	1,520	2,330	2,640	2,870 U
Selenium	0.31 U	0.31 U	3.3 U	0.31 U	0.32 U	0.36 U	3.0 U
Silver	1.0 U	1.0 U	1.1 U	1.0 U	1.1 U	1.2 U	10.0 U
Sodium	149 B	177 B	243 B	231 B	168 B	222 B	376 B
Thallium	0.20 U	0.21 U	0.22 U	0.21 U	0.21 U	0.24 U	2.0 U
Vanadium	18.7	25.9	51.5	22.5	51.5	34.1	7.0 U
Zinc	24.7	31.0	68.2	35.1	32.3	44.4	3.0 U
Cyanide	0.51 U	0.52 U	0.55 U	0.52 U	0.53 U	0.60 U	10.0 U

U - Compound was analyzed for but not detected above the Quantitation Limit

B - Not detected substantially above level reported in laboratory or field blanks

J - Indicates that analyte was present, but reported value not accurate or precise

**TABLE F-3**  
**SOIL SAMPLING RESULTS**  
**INORGANIC ANALYTES**

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Soil Boring No.	SB3	SB3	SB3	SB4	SB4	SB4
Sample No.	04	06	07	05	08	14
Sampling Depth (ft bls)	22-23.5	35-36.5	37.5-39	10-11.5	20-21.5	35-36.5
Percent Solids	91.1	93.2	88.5	97.1	94.7	90.0
Sampling Date	6-16-92	6-16-92	6-16-92	6-16-92	6-16-92	6-16-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (mg/kg)					
Aluminum	12,100	12,000	11,300	6,450	12,700	9,730
Antimony	4.5 U	4.4 U	4.6 U	4.2 U	4.3 U	4.6 U
Arsenic	2.2	2.6	2.9	0.73 B	1.3	2.9
Barium	118	108	101	56.7	112	102
Beryllium	0.47 B	0.47 B	0.43 B	0.22 B	0.38 B	0.36 B
Cadmium	0.55 U	0.54 U	0.56 U	0.51 U	0.53 U	0.56 U
Calcium	4,840	4,030	4,140	3,110	3,220	3,720
Chromium	20.1	14.1	14.1	8.4	19.5	11.9
Cobalt	8.2	8.6	8.1	4.7 B	7.2	6.9
Copper	14.6	11.1	11.0	7.2	14.9	8.6
Iron	16,600	15,600	15,300	9,750	13,800	13,500
Lead	5.8	2.8	3.4	2.0	3.0	3.0
Magnesium	4,720	5,080	4,440	3,760	3,710	4,170
Manganese	237	242	228	144	169	219
Mercury	0.11 U	0.11 U	0.11 U	0.10 U	0.11 U	0.11 U
Nickel	8.6	7.6	7.5	4.2	11.8	5.0
Potassium	2,220	2,920	2,590	1,370	1,670	2,100
Selenium	3.30 U	0.32 U	3.4 U	0.31 U	0.32 U	0.33 U
Silver	1.1 U	1.1 U	1.1 U	1.0 U	1.1 U	1.1 U
Sodium	245 B	195 B	216 B	158 B	215 B	246 B
Thallium	0.22 U	0.21 U	0.23 U	0.21 U	0.21 U	0.22 U
Vanadium	41.5	36.5	35.5	20.4	40.0	29.9
Zinc	45.5	46.6	44.8	28.2	35.7	42.1
Cyanide	0.55 U	0.54 U	0.56 U	0.51 U	0.53 U	0.55 U

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**TABLE F-3**  
**SOIL SAMPLING RESULTS**  
**INORGANIC ANALYTES**

Page 3 of 4

Soil Boring No.	SB5	SB5	SB5	SB6	SB6	SB6
Sample No.	05	09	15	04	07	12
Sampling Depth (ft bls)	10-11.5	20-21.5	35-36.5	10-11.5	17.5-19	30-31.5
Percent Solids	92.7	94.0	97.1	90.6	91.8	94.8
Sampling Date	6-16-92	6-16-92	6-17-92	6-17-92	6-17-92	6-17-92
<b>ANALYTE</b>	<b>ANALYTE CONCENTRATIONS DETECTED (mg/kg)</b>					
Aluminum	10,300	7,050	6,520	10,600	9,120	10,600
Antimony	4.4 U	5.7 U	4.2 U	4.5 U	4.5 U	4.3 U
Arsenic	2.4	1.1	1.7	1.2	1.8	4.7
Barium	99.3	71.2	67.2	93.4	80.9	91.9
Beryllium	0.38 B	0.25 B	0.26 B	0.39 B	0.33 B	0.38 B
Cadmium	0.54 U	0.53 U	0.51 U	0.55 U	0.54 U	0.53 U
Calcium	3,520	2,500	2,940	7,560	3,280	3,760
Chromium	14.2	14.0	7.5	27.1	15.4	12.0
Cobalt	6.7	4.8 B	4.5 B	6.8	5.8	6.5
Copper	10.1	8.5	6.2	14.3	9.6	8.7
Iron	13,100	11,100	9,650	14,000	11,800	12,900
Lead	5.3	2.0	2.2	6.5	15.9	3.2
Magnesium	4,060	2,830	2,740	4,060	3,820	3,800
Manganese	177	111	137	182	138	203
Mercury	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Nickel	8.2	6.3	4.0	12.4	6.9	6.3
Potassium	2,060	1,380	1,430	1,900	1,820	2,040
Selenium	0.32 U	0.32 U	0.31 U	0.33 U	0.33 U	0.32 U
Silver	1.1 U	1.1 U	1.0 U	1.1 U	1.1 U	1.1 U
Sodium	169 B	182 B	170 B	279 B	182 B	253 B
Thallium	0.22 U	0.21 U	0.21 U	0.22 U	0.22 U	0.21 U
Vanadium	32.9	32.5	22.1	31.2	28.7	29.8
Zinc	38.2	27.9	28.3	40.1	43.7	35.2
Cyanide	0.54 U	0.53 U	0.51 U	0.55 U	0.54 U	0.53 U

U - Compound was analyzed for but not detected above the Quantitation Limit

B - Not detected substantially above level reported in laboratory or field blanks

J - Indicates that analyte was present, but reported value not accurate or precise

**TABLE F-3  
SOIL SAMPLING RESULTS  
INORGANIC ANALYTES**

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Soil Boring No.	SB6	SB6	SB6		
Sample No.	14	15	16	EB2	FB1
Sampling Depth (ft bls)	35-36.5	35-36.5	30-31.5	(ug/L)	(ug/L)
Percent Solids	85.7	83.4	84.3		
Sampling Date	6-17-92	6-17-92	6-17-92	6-17-92	6-17-92

<b>ANALYTE</b>	<b>ANALYTE CONCENTRATIONS DETECTED (mg/kg)</b>				
Aluminum	15,200	17,300	22,400	73.3 B	57.0 U
Antimony	4.8 U	4.9 U	5.8 B	54.0 U	54.0 U
Arsenic	3.1	7.2	6.3	3.0 U	3.0 U
Barium	102	124	180	2.0 U	2.0 U
Beryllium	0.51 B	0.64	0.76	1.0 U	1.0 U
Cadmium	0.58 U	0.60 U	0.59 U	5.0 U	5.0 U
Calcium	5,250	5,650	7,480	38.3 B	49.1 B
Chromium	15.9	19.2	26.3	7.0 U	7.0 U
Cobalt	8.2	8.3	11.5	9.0 U	9.0 U
Copper	13.2	16.9	21.0	9.0 U	9.0 U
Iron	17,200	19,500	24,600	21.0 U	34.0 B
Lead	3.9	4.9	7.2	2.0 U	2.0 U
Magnesium	5,050	5,810	7,920	70 U	70 U
Manganese	187	248	255	2.0 U	2.0 U
Mercury	0.12 U	0.12 U	0.12 U	0.20 U	0.20 U
Nickel	9.0	9.9	13.5	12.0 U	12.0 U
Potassium	2,620	2,740	3,410	2,870 U	2,870 U
Selenium	3.50 U	3.60 U	3.6 U	3.0 U	3.0 U
Silver	1.2 U	1.2 U	1.2 U	10.0 U	10.0 U
Sodium	275 B	250 B	291 B	393 B	334 U
Thallium	0.23 U	0.24 U	0.24 U	2.0 U	2.0 U
Vanadium	40.2	46.1	58.0	7.0 U	7.0 U
Zinc	46.3	54.0	69.2	3.1 B	3.0 U
Cyanide	0.58 U	0.60 U	0.59 U	10.0 U	10.0 U

U - Compound was analyzed for but not detected above the Quantitation Limit

B - Not detected substantially above level reported in laboratory or field blanks

J - Indicates that analyte was present, but reported value not accurate or precise

**TABLE F-4**  
**WATER SAMPLING RESULTS**  
**VOLATILE ORGANIC ANALYTES**

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Well No.	MW2	MW3	MW3	AB1	EB2	TB4
Sample No.	01	01	02			
Sampling Date	7-24-92	7-24-92	7-24-92	7-24-92	7-24-92	7-24-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/L)					
Chloromethane	10 U	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	2 BJ	1 BJ	2 BJ	12 B	2 BJ	4 BJ
Acetone	10 U	7 J	7 J	14	15	10 U
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U	10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	2 J	2 J	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	10 U	10 U	10 U

U - Compound was analyzed for but not detected above the Quantitation Limit

B - Not detected substantially above level reported in field or laboratory blanks

J - Indicates that analyte was present but reported value not accurate or precise

**TABLE F-4**  
**WATER SAMPLING RESULTS**  
**VOLATILE ORGANIC ANALYTES**

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Well No.	MW2	MW3	EB3	FB3	TB5
Sample No.	02	03			
Sampling Date	9-10-92	9-10-92	9-10-92	9-10-92	9-10-92
<b>ANALYTE</b>					
Chloromethane	10 U	10 U	10 U	10 U	10 U
Bromomethane	10 U	10 U	10 U	10 U	10 U
Vinyl Chloride	10 U	10 U	10 U	10 U	10 U
Chloroethane	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	10 U	1 J	10 U	10 U	1 J
Acetone	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethene (total)	10 U	10 U	10 U	10 U	10 U
Chloroform	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane	10 U	10 U	10 U	10 U	10 U
2-Butanone	10 U	10 U	10 U	10 U	10 U
1,1,1-Trichloroethane	10 U	10 U	10 U	10 U	10 U
Carbon Tetrachloride	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	10 U	10 U	10 U	10 U	10 U
1,2-Dichloropropane	10 U	10 U	10 U	10 U	10 U
cis-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U
Trichloroethene	10 U	10 U	10 U	10 U	10 U
Dibromochloromethane	10 U	10 U	10 U	10 U	10 U
1,1,2-Trichloroethane	10 U	10 U	10 U	10 U	10 U
Benzene	10 U	10 U	10 U	10 U	10 U
Trans-1,3-Dichloropropene	10 U	10 U	10 U	10 U	10 U
Bromoform	10 U	10 U	10 U	10 U	10 U
4-Methyl-2-Pentanone	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	10 U	2 J	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	10 U	10 U	10 U	10 U	10 U
Toluene	10 U	10 U	10 U	10 U	10 U
Chlorobenzene	10 U	10 U	10 U	10 U	10 U
Ethylbenzene	10 U	10 U	10 U	10 U	10 U
Styrene	10 U	10 U	10 U	10 U	10 U
Xylene (total)	10 U	10 U	10 U	10 U	10 U

U - Compound was analyzed for but not detected above the Quantitation Limit

B - Not detected substantially above level reported in field or laboratory blanks

J - Indicates that analyte was present but reported value not accurate or precise

**TABLE F-5**  
**WATER SAMPLING RESULTS**  
**SEMIVOLATILE ORGANIC ANALYTES**

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Well No. Sample No. Sampling Date	MW2 01 7-24-92	MW3 01 7-24-92	MW3 02 7-24-92	EB2 7-24-92	MW2 02 9-10-92	MW3 03 9-10-92	EB3 9-10-92	FB3 9-10-92
<b>ANALYTE</b>	<b>ANALYTE CONCENTRATIONS DETECTED (ug/kg)</b>							
Phenol	10 U	1 BJ	6 BJ	10 U	1 J	10 U	1 J	10 U
bis (2-Chloroethyl) Ether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-Oxybis (1-Chloropropane)	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-Di-n-Propylamine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachloroethane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Isophorone	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis (2-Chloroethoxy) Methane	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-Methylphenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Dimethyl Phthalate	10 U	10 U	2 J	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Acenaphthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

U - Compound was analyzed for but not detected above the Quantitation Limit given  
J - Indicates that compound was present, but reported value not accurate or precise  
B - Not detected substantially above level reported in laboratory or field blanks

**TABLE F-5**  
**WATER SAMPLING RESULTS**  
**SEMIVOLATILE ORGANIC ANALYTES**

Page 2 of 2

Well No. Sample No. Sampling Date	MW2 01 7-24-92	MW3 01 7-24-92	MW3 02 7-24-92	EB2 7-24-92	MW2 02 9-10-92	MW3 03 9-10-92	EB3 9-10-92	FB3 9-10-92
<b>ANALYTE</b>	<b>ANALYTE CONCENTRATIONS DETECTED (ug/kg)</b>							
2,4-Dinitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4-Nitrophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Dibenzofuran	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	10 U	10 U	2 J	10 U	1 J	10 U	1 J	10 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Nitroaniline	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
4,6-Dinitro-2-Methylphenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
N-Nitrosodiphenylamine (1)	10 U	10 U	10 U	10 U	1 J	10 U	10 U	10 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Phenanthrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-Butylphthalate	10 U	10 U	2 J	10 U	10 U	10 U	1 J	10 U
Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (a) Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis (2-Ethylhexyl) Phthalate	3 BJ	2 BJ	8 BJ	11 B	3 J	4 J	2 J	2 J
Di-n-Octyl Phthalate	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (b) Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (k) Fluoranthene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (a) Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Indeno (1,2,3-cd) Pyrene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz (a,h) Anthracene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo (g,h,i) Perylene	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

U - Compound was analyzed for but not detected above the Quantitation Limit given  
J - Indicates that compound was present, but reported value not accurate or precise  
B - Not detected substantially above level reported in laboratory or field blanks



**TABLE F-6**  
**WATER SAMPLING RESULTS**  
**INORGANIC ANALYTES**

Page 1 of 2  
(Unfiltered Samples)

	MW2 01 7-24-92	MW3 01 7-24-92	MW3 02 7-24-92	EB2 7-24-92	MW2 02 9-10-92	MW3 03 9-10-92	EB3 9-10-92	FB3 9-10-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/L)							
Aluminum	1,060	5,370	4,380	93.7 B	4,950	13,400	87.4 B	87.2 B
Antimony	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U	60.0 U
Arsenic	4.0 U	4.0 U	4.0 U	4.0 U	4.7 B	8.4 B	4.0 U	4.0 U
Barium	43.6 B	75.4 B	64.1 B	1.0 U	83.6 B	122 B	1.0 U	2.0 U
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Calcium	46,700	46,700	43,100	38.4 B	47,800	49,100	64.4 B	86.5 B
Chromium	9.1 B	13.8	9.8 B	6.0 U	17.5	23.5	6.0 U	6.0 U
Cobalt	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	9.0 U
Copper	19.5 B	25.3	20.9 B	4.0 U	6.2 B	13.7 B	4.0 U	5.0 U
Iron	1,240	6,350	4,890	46.0 U	4,210	12,800	46.0 U	57.0 U
Lead	4.0	4.3	5.2	3.4	3.3	6.4	2.0 U	2.7 B
Magnesium	10,000	11,800	10,700	42.0 U	11,100	13,400	42.0 U	46.0 U
Manganese	44.4	204	173	1.0 U	98.6	218	1.0 U	2.0 U
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	11.0 U
Potassium	3,440 B	4,260 B	3,400 B	1,250 U	2,440 B	4,110 B	1,250 U	1,360 U
Selenium	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Silver	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Sodium	17,300	17,700	16,100	610 B	16,300	16,800	466 B	480 B
Thallium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vanadium	14.9 B	22.6 B	18.4 B	5.0 U	20.0 B	38.8 B	5.0 U	5.0 U
Zinc	523	269	248	4.0 B	109	125	62.2	74.8
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

U - Compound was analyzed for but not detected above the Quantitation Limit  
B - Not detected substantially above level reported in laboratory or field blanks

**TABLE F-6**  
**WATER SAMPLING RESULTS**  
**INORGANIC ANALYTES**

Page 2 of 2  
(Filtered Samples)

Well No.	MW2	MW3	MW3		MW2	MW3		
Sample No.	01	01	02	EB2	02	03	EB3	FB3
Sampling Date	7-24-92	7-24-92	7-24-92	7-24-92	9-10-92	9-10-92	9-10-92	9-10-92
ANALYTE	ANALYTE CONCENTRATIONS DETECTED (ug/L)							
Aluminum	56.5 B	54.0 B	56.3 B	93.7 B	117 B	345	87.4 B	87.2 B
Antimony	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U	39.0 U	60.0 U
Arsenic	4.0 U	4.0 U	4.0 U	4.0 U	4.5 B	4.0 U	4.0 U	4.0 U
Barium	17.6 B	33.1 B	31.8 B	1.0 U	47.2 B	43.3 B	1.0 U	2.0 U
Beryllium	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cadmium	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Calcium	44,400	47,200	45,500	38.4 B	47,500	50,400	64.4 B	86.5 B
Chromium	6.0 U	6.0 U	6.2 B	6.0 U	7.2 B	7.6 B	6.0 U	6.0 U
Cobalt	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	9.0 U
Copper	7.9 B	5.3 B	6.8 B	4.0 U	7.9 B	5.6 B	4.0 U	5.0 U
Iron	46.0 U	46.0 U	46.0 U	46.0 U	46.0 U	282	46.0 U	57.0 U
Lead	2.0 U	2.0 B	2.0 U	3.4	2.0 U	2.0 U	2.0 U	2.7 B
Magnesium	9,550	10,700	10,300	42.0 U	10,100	11,000	42.0 U	46.0 U
Manganese	23.3	111	106	1.0 U	14.2 B	58.8	1.0 U	2.0 U
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	11.0 U
Potassium	2,910 B	2,680 B	2,930 B	1,250 U	1,720 B	1,760 B	1,250 U	1,360 U
Selenium	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
Silver	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U
Sodium	16,800	17,900	17,200	610 B	16,900	17,400	466 B	480 B
Thallium	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Vanadium	13.3 B	8.8 B	9.5 B	5.0 U	11.1 B	10.0 B	5.0 U	5.0 U
Zinc	150	55.4	51.4	4.0 B	42.4	42.1	62.2	74.8
Cyanide	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

U - Compound was analyzed for but not detected above the Quantitation Limit  
B - Not detected substantially above level reported in laboratory or field blanks

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**APPENDIX G**  
**DATA VALIDATION REPORTS**

**DATE:** August 13, 1992  
**TO:** Carl Giesler  
**FROM:** Judy Kirkland *YAK*  
**SUBJECT:** Data Validation  
Ontario Air National Guard, Site 1  
Expanded Site Investigation

**OVERVIEW:** Environmental samples were collected from the west side of the vehicle maintenance area within Site 1. Samples were collected between June 15 and June 17, 1992. Twenty-one soil samples were taken from six boreholes.

Two field blanks (decontamination source water blanks), two trip blanks and two equipment blanks were also collected as part of the overall sampling effort. A total of 27 Site 1 samples were validated. The samples were analyzed for organics, and inorganics (including cyanide), according to what was requested on the chain of custodies (COC).

This data package included the following sample data group (SDG) or batch numbers generated by CompuChem:

**SITE 1**

25744-71 (1 soil sample)	25744-13 (20 soil samples)
937294	574437
57294	937293

25744-51 (6 water samples)  
936334  
574453

CompuChem Laboratories, Incorporated, in Research Triangle Park North Carolina performed all of the analyses. Both organic and inorganic analyses were carried out using the March 1990 Contract Laboratory Program (CLP) Statements of Work for inorganic and organic analyses. Soil results were reported on a dry weight basis.

Data validation procedures outlined in "The HAZWRAP Requirements for Quality Control of Analytical Data", July 1990, were followed. Procedures for Level C data review were followed as requested in the November 1991 ESI work plan.

**SUMMARY:** All samples were analyzed for the requested analytes. One VOA sample bottle (OANGEB2) was received by the laboratory in a broken vial. This did not affect the VOA analysis because multiple VOA vials were shipped. All other samples were received in good condition.

**BLANKS:** All VOA method blanks were contaminated with methylene chloride. In addition to the methylene chloride, some of the VOA blanks contained acetone and benzene. The associated sample data were qualified accordingly, using the 10X or 5X rule for blank contamination. These qualified results can be found in Appendix B on the Data Summary Forms.

The SVOA method blanks also contained contaminants. CompuChem explains in the case narrative for SDG# 25744-13 that the methylene chloride used for sample extraction was contaminated. This contamination was not detected until after the samples had been extracted. A new lot of methylene chloride was purchased and was found to be free of these early eluting contaminants. In SDG# 25744-51, 2 of the contaminants were tentatively identified as methylpropyl cyclohexane and 2-(2-ethoxyethoxy) ethanol.

The three metal preparation blanks also contained contaminants. Two of the blanks contained aluminum and calcium and the third blank contained zinc and iron. Sample results which were less than 5X the blank concentration received J qualifiers.

One field blank (OANG-FB2) and one equipment blank (OANG-EB2) contained methylene chloride exceeding the amount of methylene chloride detected in the laboratory preparation blanks. No SVOAs were detected in any equipment, field, or trip blanks. Iron was the only metal contaminant detected in sample OANG-EB1. No other metal contaminants were detected in the equipment, field or trip blanks.

**CALIBRATION:** All initial calibration and continuing calibration criteria were met for all parameters analyzed.

**HOLDING TIME:** No holding time was exceeded for any sample analyzed.

**FIELD DUPLICATES:** No field duplicate samples were submitted for analyses.

**MATRIX SPIKES/MATRIX SPIKE DUPLICATES:** The MS/MSD data were checked for percent recovery (%R), as well as relative percent difference (RPD). There were four instances in which the %R reported was not correctly calculated. In all 4 cases, the correct %R did exceed control limits. In other cases, the %R exceeded control limits and the results were qualified as estimates (J) (see Appendix B).

One soil SDG# 25744-71 had 6 RPDs that were higher than the limits allowed. However, since the limits were only advisory, no further action was required by the laboratory. For SDG# 25744-13 SVOA analyses, the MS/MSD was analyzed on a different day and on a different instrument. Although the %R and the RPDs were within limits, this is not proper laboratory procedure. The purpose of the MS/MSD is to check for matrix interference under the same analytical conditions as the samples. This comparison could not be made in this case.

In SDG# 574453 (cyanide), the spiked sample result (SSR) was recorded incorrectly. From the raw data, the SSR should be 200.6269 micrograms/liter, instead of 100.3135 micrograms/liter. This caused the %R to be outside control limits, however, since the sample results were below the instrument detection limits, no data qualification was necessary.

**TENTATIVELY IDENTIFIED COMPOUNDS:** Three samples contained tentatively identified compounds (TICS). They were as follows:

OANGFB1	10 micrograms/liter diphenylmethanone
OANGSB607	1700 micrograms/liter propenylbenzodioxole
OANGSB405	100 micrograms/liter tetrachloroethane

All TIC results were approximate. The first 2 compounds diphenylmethanone and propenylbenzodioxole, are associated with the manufacturing of perfumes. It was possible that these semivolatile organic compounds could have been introduced inadvertently by field or laboratory personnel. Tetrachloroethane, at a concentration of 100 micrograms/liter, should have been detected in the VOA sample. This is an early eluting compound and could have been part of the methylene chloride contamination mentioned previously in the blank section of this report.

**LABORATORY CONTROL SAMPLE:** The LCS was out-of-control for potassium and sodium for soil SDG# 937293. The %R control limits were 80-120%. For potassium the %R was 988% and for sodium the %R was 136.4%. CompuChem's case narrative for this SDG stated that all of the LCSs were in control. No redigestion or reanalysis was reported for the samples associated with this out of control LCS. Therefore, the data was qualified as unusable (R) for potassium and sodium in this SDG.

**CONCLUSION:** In conclusion, the data validated for this round of samples should be considered usable, with the exception of the data associated with the out-of-control LCS mentioned above. It should be noted however, that the chain of custody forms did not list sample preservation methods, i.e. refrigeration or chemical preservative added. TETC COC forms were not used. This information ultimately had to be obtained from the field logbook.

Two of the common laboratory contaminants methylene chloride and acetone were detected in almost all of the VOA analyses. In some samples, the concentration of these analytes were higher than 10 times the concentration detected in the associated blank. Please be aware that these hits may or may not have originated from the samples, since the blank contamination was so widespread.

Please note that reported TICs are not confirmed but tentative identification. A concentration of 100 micrograms/liter of tetrachlorethane should have been detected in the associated VOA analyses. CompuChem used the GC/MS compound library to select the best spectral match to the unknown compound.

Two attachments are included with this report, Appendix A and Appendix B. Appendix A contains a list of the data qualifiers and their definitions. Appendix B contains the Data Summary Forms.

**ATTACHMENTS:** Appendix A Glossary of Data Qualifier Codes  
Appendix B Data Summary Forms

cc: Rob Kravitz

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**Appendix A**  
**Glossary of Data Qualifier Codes**

## Glossary of Data Qualifier Codes

### Codes Related to Identification (confidence concerning presence or absence of compounds):

U	=	Not detected. The associated number indicates approximate sample concentration necessary to be detected.
(No Code)	=	Confirmed identification.
B	=	Not detected substantially above the level reported in laboratory or field blanks.
R	=	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
N	=	Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

### Codes Related to Quantitation (can be used for both positive results and sample quantitation limits):

J	=	Analyte present. Reported value may not be accurate or precise.
K	=	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	=	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	=	Not detected, quantitation limit may be inaccurate or imprecise.
UL	=	Not detected, quantitation limit is probably higher.

### Other Codes:

Q	=	No analytical result.
---	---	-----------------------

**Appendix B**  
**Data Summary Forms**

Q  
1  
8

DATA SUMMARY FORM: VOLATILES 1

Sit. no: Ontario Air National Guard

SOIL SAMPLES

(µg/Kg)

Case # 12574413 Sampling Date(s): 6/15, 6/16, 6/17/92

To calculate sample quantitation limit:  
(CRQL \* Dilution Factor) / ((100 - % moisture)/100)

Sample No. Dilution Factor % Moisture Location	Result CRQL	Result CRQL	Result CRQL	Result CRQL	Result CRQL	Result CRQL	Result CRQL	Result CRQL	Result CRQL
7	12	2	5	18	3	5	10	11	11
12	13	19	1A 31	32	19	23	27	27	27
94	20	320	U 340	75	300	50	82	82	82
Chloromethane									
Bromomethane									
Vinyl Chloride									
Chloroethane									
Methylene Chloride									
Acetone									
Carbon Disulfide									
1,1-Dichloroethene									
1,1-Dichloroethane									
Total 1,2-Dichloroethene									
Chloroform									
1,2-Dichloroethane									
2-Butanone									
1,1,1-Trichloroethane									
Carbon Tetrachloride									
Vinyl Acetate									
Bromodichloromethane									

Site Name: Ontario Air National Guard

Case # 25747-13 Sampling Date(s): 6/15, 6/16, 6/17/92

**SOIL SAMPLES**  
**(µg/kg)**

**To calculate sample quantitation limit:**  

$$(CRQL * Dilution Factor) / ((100 - \% moisture)/100)$$

[illegible]



Site Name: Intacio Air National Guard

**SOIL SAMPLES**  
**(µg/kg)**

Case # 05744-13 Sampling Date(s): 6/15, 6/16, 6/17/92

**To calculate sample quantitation limit:**  
 **$(\text{CROL} * \text{Dilution Factor}) / ((100 - \% \text{ moisture}) / 100)$**

[illegible]

DATA SUMMARY FORM: VOLATILES 2

12  
Site Name: Ontario Air National Guard

Case # 25744-13 Sampling Date(s): 6/5, 6/16, 6/17/92

**SOIL SAMPLES**  
**(µg/kg)**

**To calculate sample quantitation limit:**  

$$(CRQL * Dilution Factor) / ((100 - \% moisture)/100)$$

Sample No.	Dilution Factor	% Moisture	Location
205	3	9	
206	3	9	
207	3	9	
208	3	9	
209	3	9	
210	3	9	
211	3	9	
212	3	9	
213	3	9	
214	3	9	
215	3	9	
216	3	9	
217	3	9	
218	3	9	
219	3	9	
220	3	9	
221	3	9	
222	3	9	
223	3	9	
224	3	9	
225	3	9	
226	3	9	
227	3	9	
228	3	9	
229	3	9	
230	3	9	
231	3	9	
232	3	9	
233	3	9	
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247	3	9	
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257	3	9	
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309	3	9	
310	3	9	
311	3	9	
312	3	9	
313	3	9	
314	3	9	
315	3	9	
316	3	9	
317	3	9	
318	3	9	
319	3	9	
320	3</		

**SEE NARRATIVE FOR CODE DEFINITIONS**  
**revised 07/90**



DATA SUMMARY FORM: B N A S 3

SOIL SAMPLES  
(µg/Kg)

Site Name: Ontario Air National Guard

Case # 25744-13 Sampling Date(s): 6/15, 6/16, 6/17

To calculate sample quantitation limit:  
(CRQL \* Dilution Factor) / ((100 - % moisture)/100)

Sample No. Dilution Factor % Moisture Location	COMPOUND	Result CRQL Q	DAN6SB616	DAN6SB612	DAN6SB614	DAN6SB605	DAN6SB604	DAN6SB607	DAN6SB615	DAN6SB615
9	N-Nitrosodiphenylamine	360								
	4-Bromophenyl-phenylether	V								
	Hexachlorobenzene									
	Pentachlorophenol	870								
	Phenanthrene	360								
	Anthracene									
	Di-n-butylphthalate									
	Fluoranthene									
	Pyrene									
	Butylbenzylphthalate									
	3,3'-Dichlorobenzidine									
	Benzo(a)anthracene									
	Chrysene									
	bis(2-Ethylhexyl)phthalate	45								
	Di-n-octylphthalate									
	Benzo(b)fluoranthene									
	Benzo(k)fluoranthene									
	Benzo(a)pyrene									
	Indeno(1,2,3-cd)pyrene									
	Di-benz(a,h)anthracene									
	Benzo(g,h)perylene									
	Carbazole									

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revised 07/90

**G-14**

Site Name: Ontario Air National Guard

**SOIL SAMPLES**  
**(µg/Kg)**

Case # 125744-13 Sampling Date(s): 6/15, 6/16, 6/17

To calculate sample quantitation limit:  

$$(CRL \times \text{Dilution Factor}) / ((100 - \% \text{ moisture}) / 100)$$

[illegible]

SEE NARRATIVE FOR CODE DEFINITIONS  
06/79 revised 07/90

DATA SUMMARY FORM: I N O R G A N I C S

SOIL SAMPLES  
(mg/Kg)

Site Name: Ontario Air National Guard

Case # 937293 Sampling Date(s): 6/15, 6/16, 6/17

+Due to dilution, sample quantitation limit is affected.  
See dilution table for specifics.

Sample No. Dilution Factor & Solids Location	DANGS8306		DANGS8307		DANGS8109		DANGS8115		DANGS8209		DANGS8215		DANGS8401		DANGS8414	
ANALYTE	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	12400		5630		12700		10900		6450		12700		9470		9470	
Antimony	4.1	J	4.2	J	4.5	J	4.3	J	4.3	J	4.3	J	4.3	J	4.3	J
Arsenic	2.6		14		9.6		2.0		0.73		1.3		2.9		1.6	
Barium	109		181		160		108		56.7		112		102		54.3	
Beryllium	0.47	J	0.22	J	0.62	J	0.43	J	0.22	J	0.38	J	0.38	J	0.23	J
*Cadmium	0.54		0.51		0.55		0.53		0.51		0.53		0.56		0.52	
Calcium	4030		2580		6060		2430		3460		3220		3720		3690	
*Chromium	4.1		7.2		22.7		20.4		12.9		19.5		11.9		7.9	
Cobalt	8.6		4.4	J	10.3		5.0		7.8	J	7.2		6.9		5.3	
Copper	11.1		5.6		19.0		14.3		10.5		14.9		8.6		6.8	
Iron	15600		8940		22200		16200		19200		13800		13500		11500	
*Lead	3.8		1.9		5.9		2.2		2.9		3.0		3.0		1.6	
Magnesium	5080		2910		7220		3250		4670		3760		470		290	
Manganese	242		137		564		87.8		221		169		219		117	
Mercury	ND		ND		ND		ND		ND		ND		ND		ND	
*Nickel	7.6		4.9		12.5		7.5		7.1		11.8		5.0		4.7	
Potassium	2120	R	210	R	3770	R	2330	R	2640	R	1370	R	2100	R	1730	R
Selenium	0.32	J	0.31	J	3.3	J	0.32	J	0.36	J	0.31	J	0.33	J	0.31	J
Silver	1.1	J	1.0	J	1.1	J	1.1	J	1.2	J	1.0	J	1.1	J	1.0	J
Sodium	195	R	149	R	243	R	169	R	158	R	215	R	246	R	177	R
Thallium	0.21	J	0.20	J	0.22	J	0.21	J	0.24	J	0.21	J	0.22	J	0.21	J
Vanadium	36.5		18.7		51.5		51.5		34.1		40.0		29.9		25.9	
Zinc	46.6		24.7		69.2		32.3		44.4		35.7		42.1		91.0	
*Cyanide	NP		ND		ND		ND		ND		ND		ND		ND	

DATA SUMMARY FORM: I N O R G A N I C S

Site Name: Ontario Air National Guard SOIL SAMPLES (mg/Kg)

Case # 937293 Sampling Date(s): 6/15, 6/16, 6/17

+Due to dilution, sample quantitation limit is affected.  
See dilution table for specifics.

Sample No. Dilution Factor X Solids Location	ANALYTE	DANESB205		DANESB304		DANESB616		DANESB612		DANESB614		DANESB505		DANESB604		DANESB607		DANESB615		DANESB275	
		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
20.0	Aluminum	6790		12100		22400		10600		15200		10300		10400		9120		17300		6520	
6.0	Antimony	4.2	J	4.5	J	5.8	J	4.3	J	4.8	J	4.4	J	4.5	J	4.5	J	4.9	J	4.2	J
1.0	Arsenic	0.79	J	2.2	J	6.3	J	4.7	J	3.1	J	2.4	J	1.2	J	1.9	J	7.2	J	1.7	J
20.0	Barium	680		119		180		919		42		94.3		93.4		80.9		124		67.2	
0.5	Beryllium	0.23	J	0.47	J	0.16	J	0.38	J	0.51	J	0.88	J	0.39	J	0.33	J	0.64	J	0.26	J
0.5	Cadmium	0.52		0.55		0.59		0.53		0.58		0.54		0.55		0.54		0.60		0.51	
50.0	Calcium	3000		4840		7480		3760		5250		3500		280		3280		5850		290	
1.0	Chromium	11.8		20.1		26.3		12.0		15.9		14.2		27.1		15.4		18.2		7.5	
1.0	Cobalt	5.0		8.2		11.5		6.5		8.2		6.7		6.8		5.8		8.3		9.5	
2.5	Copper	9.5		14.6		21.0		8.7		13.2		10.1		14.3		9.6		16.9		6.2	
10.0	Iron	10700		16600		24600		12900		17200		13100		14400		11800		19500		450	
0.5	Lead	2.8		5.8		12.2		3.2		3.9		5.3		6.5		15.9		4.9		2.2	
50.0	Magnesium	3490		4720		7120		3800		5050		4400		1060		3820		5810		270	
1.5	Manganese	137		237		355		203		187		177		192		138		248		137	
2.0	Mercury	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
4.0	Nickel	5.0		4.6		13.5		6.3		9.0		8.2		12.4		6.9		9.9		4.0	
50.0	Potassium	1520		2220		3410		2040		2620		3060		1900		1820		2740		440	
0.5	Selenium	0.31	J	3.3	J	3.6	J	0.32	J	3.5	J	0.32	J	0.33	J	0.33	J	3.6	J	0.31	J
1.0	Silver	1.0	J	1.1	J	1.2	J	1.1	J	1.2	J	1.1	J	1.1	J	1.1	J	1.2	J	1.0	J
50.0	Sodium	231		245		291		253		275		169		349		182		250		170	
1.0	Thallium	0.21	J	0.22	J	0.24	J	0.21	J	0.23	J	0.22	J	0.22	J	0.22	J	0.14	J	0.21	J
5.0	Vanadium	22.5		41.5		58.0		29.8		40.2		32.9		31.2		28.7		46.1		22.1	
2.0	Zinc	35.1		45.5		69.2		35.2		46.3		38.2		40.1		43.7		54.0		26.3	
0.1 (6.0)	Cyanide	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	

Site Name: Ontario Air National Guard

**SOIL SAMPLES**  
**(µg/Kg)**

Case # 125744-71 Sampling Date(s): 6/16/92

**To calculate sample quantitation limit:**  

$$(CRQL * Dilution Factor) / ((100 - \% moisture)/100)$$

	Sample No.	Dilution Factor	% Moisture Location
	DM68B-SD9	1.0	b
CORQ	COMPOUND	Result Q	
11	Chloromethane	ND	
	Bromomethane		
	Vinyl Chloride		
	Chloroethene		
	Methylene Chloride	✓	
	'Acetone	32	
	Carbon Disulfide	ND	
	1,1-Dichloroethene		
	1,1-Dichloroethane		
	Total 1,2-Dichloroethene		
	Chloroform		
	1,2-Dichloroethane		
	2-Butanone		
	1,1,1-Trichloroethene		
	Carbon Tetrachloride		
	Vinyl Acetate		
↓	Bromodichloromethane	✓	

**G-17**

SEE NARRATIVE FOR CODE DEFINITIONS  
revised 07/90

DATA SUMMARY FORM: INORGANICS

Site Name: Ontario Air National Guard

SOIL SAMPLES  
(mg/Kg)

Case #: 937294 Sampling Date(s): 6/16/92

+Due to dilution, sample quantitation limit is affected.  
See dilution table for specifics.

Sample No. Dilution Factor X Solids Location		Result										
CRDL	ANALYTE											
200	Aluminum	7050										
4.0	Antimony	5.7	5									
1.0	*Arsenic	1.1										
20.0	Barium	762										
0.5	Beryllium	0.25	I									
0.5	*Cadmium	0.53	I									
500	Calcium	2500										
1.0	*Chromium	14										
5.0	Cobalt	4.8	I									
2.5	Copper	8.5										
10.0	Iron	14100										
0.3	*Lead	2.0										
500.0	Magnesium	2830										
1.5	Manganese	111	I									
0.1	Mercury	ND										
4.0	*Nickel	6.3										
500	Potassium	1380										
0.5	Selenium	0.32	I									
1.0	Silver	1.1	5									
500.0	Sodium	182	5									
1.0	Thallium	0.21	5									
5.0	Vanadium	32.5										
2.0	Zinc	27.9										
0.53	*Cyanide	ND										

DATA SUMMARY FORM: VOLATILES 1

Site Name: Ontario Air National Guard

WATER SAMPLES  
(µg/L)

Case #: 25744-S Sampling Date(s): 6/15 & 6/17/92

To calculate sample quantitation limit  
(CRQL = Dilution Factor

CRQL	Sample No. Dilution Factor Location	COMPOUND	DANG-EB1	DANG-TB1	DANG-TB2	DANG-FB2	DANG-EB2	DANG-FB1
10		Chloromethane						
		Bromomethane						
		*Vinyl Chloride						
		Chloroethane						
		*Methylene Chloride	26	U	26	U	40	25
		Acetone						
		Carbon Disulfide						
		*1,1-Dichloroethane						
		1,1-Dichloroethane						
		*Total 1,2-Dichloroethane						
		Chloroform						
		*1,2-Dichloroethane						
		*2-Butanone						
		*1,1,1-Trichloroethane						
		*Carbon Tetrachloride						
		Vinyl Acetate						
		Bromodichloromethane						

Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS!  
revised 07/91

20 Site Name: Ontario Air National Guard

## WATER SAMPLES

Case # 257445 / Sampling Date(s): 6/5 & 6/17/92

To calculate sample quantitation limit,  
(CRQL = Dilution Factor)

[illegible]

### Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS  
revised 07/90





## DELIVERABLE QUALITY CONTROL REVIEW FORM

Document Title: Data Validation - Ontario Air National Guard, ESI Site 1

☐ Draft ☒ Final

Client: HAZWRAP

TETC Project Number: 928905-01

### REVIEW FINDINGS

1. Review against Statement of Work requirements:

☒ Acceptable C. A. Pryateny Signature  
☐ Not Acceptable CHRISTINE A. PRYATENY Printed Name  
14 Aug 92 Date

2. Data validation and accuracy of findings:

☒ Acceptable C. A. Pryateny Signature  
☐ Not Acceptable CHRISTINE A. PRYATENY Printed Name  
14 Aug 92 Date

3. Editorial quality:

☒ Acceptable C. A. Pryateny Signature  
☐ Not Acceptable CHRISTINE A. PRYATENY Printed Name  
14 Aug 92 Date

4. Comments: \_\_\_\_\_

### QUALITY CONTROL REVIEW VALIDATION

Glen J. Barrett Signature 8/14/92 Date  
Glen J. Barrett Printed Name  
Health & Safety Officer Title



## MEMORANDUM

**DATE:** October 13, 1992  
**TO:** Carl Giesler  
**FROM:** Judy Kirkland *JAK*  
**SUBJECT:** Data Validation  
Ontario Air National Guard, Site 1  
Expanded Site Investigation

**OVERVIEW:** Environmental samples were collected from two groundwater monitoring wells, one of which was located upgradient from Site 1 and the other located downgradient of Site 1. The upgradient groundwater samples were used for background comparisons. Samples were collected on July 24, 1992. Three samples were taken from 2 groundwater monitoring wells.

One ambient blank, one equipment blank and one trip blank were also collected as part of the overall sampling effort. A total of 6 samples were validated. The samples were analyzed for organics, and inorganics (including cyanide), according to what was requested on the chain of custody (COC).

This data package included the following sample data group (SDG) or batch numbers generated by CompuChem:

25957-1 (VOA, SVOA)  
936344 (metals total and dissolved)  
595713 (cyanide)

CompuChem Laboratories, Incorporated, in Research Triangle Park North Carolina performed all of the analyses. Both organic and inorganic analyses were carried out using the March 1990 Contract Laboratory Program (CLP) Statements of Work (SOW) for inorganic and organic analyses.

Data validation procedures outlined in "The HAZWRAP Requirements for Quality Control of Analytical Data", July 1990, were followed. Procedures for Level C data review were followed as requested in the November 1991 ESI work plan.

**SUMMARY:** All samples were analyzed for the requested analytes and were received in good condition.

**BLANKS:** The ambient blank (OANGAB1) and the equipment blank (OANGEB2) both contained acetone. Although acetone is a common laboratory contaminant, it was not detected in the VOA method blank. The trip blank (OANGTB4), the equipment blank and the ambient blank, as well as the samples, all contained some methylene chloride. However, the amounts detected were less than 10 times the amount of methylene chloride detected in the method blank. All samples were given the B qualifier for blank contamination.

The SVOA method blank also contained contaminants. When these contaminants were detected in the samples the 5 times and 10 times rules were applied and the data was qualified as either B or estimates (J).

In the water preparation blank for inorganics, there are 3 blank contaminants above the instrument detection limit (IDL), i.e. aluminum, calcium, and sodium. Following the 5 times rule for inorganic blank contamination, sample OANGEB2, OANGMW302(D), OANGMW301(D), and OANGMW201(D) were qualified with a J for aluminum. Sample OANGEB2 was qualified as J for calcium and sodium.

**CALIBRATION:** All initial calibration and continuing calibration criteria were met for all parameters analyzed.

**HOLDING TIME:** No holding time was exceeded for any sample analyzed.

**FIELD DUPLICATES:** One set of field duplicates (OANGMW301, OANGMW302) was submitted for analyses. Both samples were analyzed for organics and inorganics (including cyanide), as required by the chain of custody. HAZWRAP Level C does not specify any data validation requirements for field duplicates. However, the relative percent difference (RPD) for the analytes detected from the VOA analyses were 0% for both acetone and tetrachlorethene, and 67% for methylene chloride. Semivolatile analyses detected only 4 analytes, 3 of which were phthalates. Phenol had a RPD of 143%, however, phenol was also detected in the method blank.

**MATRIX SPIKES/MATRIX SPIKE DUPLICATES:** The MS/MSD data were checked for percent recovery (%R), as well as relative percent difference (RPD). All %R were within control limits for VOA analyses. Three SVOA compounds were not within limits for %R. Since these limits are only advisory as per the 3/90 SOW, no further action was required by the lab and therefore, no qualification of the data was necessary. The %R for selenium was 0%. Since all selenium results were below the instrument detection limit (IDL), the results were qualified as unusable (R). All RPDs were within control limits for all parameters analyzed.

**TENTATIVELY IDENTIFIED COMPOUNDS:** No tentatively identified compounds (TICS) were detected for VOA analyses. For SVOA analyses, unknown hydrocarbons, unknown carboxylic acids, unknowns, lab artifacts, and blank contaminants were detected in the samples analyzed.

All TIC results were approximate and could not be identified more specifically than mentioned above. The laboratory artifacts found in OANGEB2 and OANGMW301 were also found in the SVOA method blank. However, the laboratory artifact found in sample OANGMW302 was not detected in the blank. It has been tentatively identified as either 2-methyl-,1-(1,1-dimethylethyl)-2-methyl-1,propanoic acid or 2-methyl-,2-ethyl-1-propyl-1,3-propanediyl propanoic acid. The estimated concentration of this laboratory artifact is 4 micrograms/liter. This artifact is currently under investigation by CompuChem.

**LABORATORY CONTROL SAMPLE:** All elements were within the control limits for the laboratory control sample (LCS). No LCS was required for mercury and cyanide analysis.

**CONCLUSION:** In conclusion, the data validated for this round of samples should be considered usable, with the exception of the data associated with the out-of-control %R for selenium and the blank contamination data mentioned above. It should be noted however, that the chain of custody form did not list sample preservation methods, i.e. temperature control or chemical preservative. This information ultimately had to be obtained from the field logbook. Also note, that a sample labeled LABPURES was included in the VOA report, however, it was not listed on the chain-of-custody form.

Two attachments are included with this report, Appendix A and Appendix B. Appendix A contains a list of the data qualifiers and their definitions. Appendix B contains the Data Summary Forms.

**ATTACHMENTS:** Appendix A Glossary of Data Qualifier Codes  
Appendix B Data Summary Forms

cc: Rob Kravitz

# Appendix A

## Glossary of Data Qualifier Codes

## GLOSSARY OF DATA QUALITY CODES

### Codes Related to Identification (confidence concerning presence or absence of compounds):

U	=	Not detected. The associated number indicates approximate sample concentration necessary to be detected.
(No Code)	=	Confirmed identification.
B	=	Not detected substantially above the level reported in laboratory or field blanks.
R	=	Unreliable results. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
N	=	Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

### Codes Related to Quantitation ( can be used for both positive results and sample quantitation limits):

J	=	Analyte present. Reported value may not be accurate or precise.
J <sub>1</sub>	=	Analyte present. The reported value is estimated because of the presence of interference.
K	=	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	=	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	=	Not detected, quantitation limit may be inaccurate or imprecise.
UJ <sub>1</sub>	=	The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).
UL	=	Not detected, quantitation limit is probably higher.

### Other Codes:

Q	=	No analytical result.
---	---	-----------------------







30  
Site No. 11: Ontario Air National Guard

Case # 95957-1 Sampling Date(s): 7/24/92

**To calculate sample quantitation limit:  
(C<sub>LOQ</sub> = Dilution Factor)**

Sample No.		Pollution Factor		Location		Result + Q Result Q	
COAL	COMPOUND						
10	*1,2-Dichloroethane						
10	Cis-1,3-Dichloropropene						
10	Trichloroethene						
10	o-Bromochloroethane						
10	1,1,2-Trichloroethane						
10	*Benzene						
10	Trans-1,2-Dichloroethane						
10	Bromoform						
10	4-Methyl-2-pentene						
10	2-Hexene						
10	*Tetrachloroethene						
10	1,1,2,2-Tetrachloroethane						
10	*Xylene						
10	*Chlorobenzene						
10	*Ethylbenzene						
10	*Styrene						
10	*Total Xylenes						

Contract	Contract Required Quantitation Limit
1	1000
2	1000
3	1000
4	1000
5	1000
6	1000
7	1000
8	1000
9	1000
10	1000
11	1000
12	1000
13	1000
14	1000
15	1000
16	1000
17	1000
18	1000
19	1000
20	1000
21	1000
22	1000
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87	1000
88	1000
89	1000
90	1000
91	1000
92	1000
93	1000
94	1000
95	1000
96	1000
97	1000
98	1000
99	1000
100	1000

## Action Level: Exists

SEE NARRATIVE FOR CODE DEFINITIONS  
revised 07/92

OCT 15 15:49 ETC

DATA SUMMARY FORM: B M A S 1

Site No: Ontario Air National Guard

Case # 25957-1 Sampling Date(s): 7/24/92

WATER SAMPLES  
(µg/L)

To calculate sample quantitation limit:  
(CQL = Dilution Factor)

Sample No. Dilution Factor Location		Result Q Result Q		Action Level Exists		SEE NARRATIVE FOR CODE DEFINITIONS		revised 07/92	
CQL	COMPOUND	1	6						
10	Phenol								
10	bis(2-Chloroethyl) Ether								
10	2-Chlorophenol								
10	o,3-Dichlorobenzene								
10	o,4-Dichlorobenzene								
10	1,2-Dichlorobenzene								
10	2-Methylphenol								
10	bis(2-Chloroacetyl) Ether								
10	4-Methylphenol								
10	N-Miscane-di-n-pentylamine								
10	Hexachlorocyclopentadiene								
10	Nitrobenzene								
10	Isophthalic acid								
10	2-Nitrophenol								
10	2,4-Dinitrophenol								
10	bis(2-Chloroacetyl) Ether								
10	2,4-Dichlorophenol								
10	1,2,4-Trichlorobenzene								
10	Naphthalene								
10	4-Chlorophenol								

CQL = Contract Required Quantitation Limit

Ontario Air National Guard

Case # 135957-17  
Sampling Date(s): 7/24/92

WATER SAMPLES  
(7/54)

**To calculate sample quantitation multi:  
(CPL + Dilution Factor)**

Sample No.	Dilution Factor	Location	Result
10		Hexachlorocyclopentadiene	
10		4-Chloro-3-methylphenol	
10		2-Methylnaphthalene	
10		Hexachlorocyclopentadiene	
10		2,4,6-Trichlorophenol	
25		2,4,5-Trichlorophenol	
10		2-Chloronaphthalene	
25		2-Nitroaniline	
10		Dimethylphthalate	
10		Acenaphthylene	
10		2,6-Dinitrotoluene	
25		3-Nitroaniline	
10		Acenaphthene	
25		2,4-Dinitrophenol	
25		4-Nitrophenol	
10		Dibenzofuran	
10		2,4-Dinitrotoluene	
10		Diethylphthalate	
10		4-Chlorophenyl-phenylether	
10		Fluorene	
25		4-Nitroaniline	
25		4,6-Dinitro-2-methylphenol	

**CRQL = Contract Required Quantitation Limit**

**SEE NARRATIVE FOR CODE DEFINITIONS**  
**revised 07/92**

Oct 15 '92 15:51 ETC

Site Name: Ontario Air National Guard

Case # 25957-1 Sampling Date(s): 7/24/92

WATER SAMPLES  
(µg/L)

To calculate sample quantitation limit:  
(CQGL = Dilution Factor)

CQGL	CONC	Sample No. Dilution Factor Location	CHANGELAB CHEN/2010 CHANGELAB CHEN/2010									
			Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
10		4-Nitroodiphenylamine										
10		4-Bromophenyl-phenylether										
10		Hazachlorobenzene										
25		Pentachlorophenol										
10		Phenanthrene										
10		Anthracene										
10		Carbazole										
10		91-n-butylphthalate										
10		Fluoranthene										
10		Pyrene										
10		Butylbenzylphthalate										
10		3,3'-dichlorobenzidine										
10		Benzo(a)anthracene										
10		Chrysene										
10		1,2,3-trimethylphthalate										
10		61-n-methylphthalate										
10		Benzo(b)fluoranthene										
10		Benzo(k)fluoranthene										
10		Benzo(a)pyrene										
10		Indeno(1,2,3-cd)pyrene										
10		Benzo(a,h)anthracene										
10		Benzo(g,h,i)perylene										

SEE NARRATIVE FOR CODE DEFINITIONS  
revised 07/92

Action Level Exists

CQGL = Contract Required Quantitation Limit

**G-34**

**Site Name:**

34 Site Name: Ontario Air National Guard

Case # 926344 Sampling Date(s): 7/24/92

**WATER SAMPLES**  
**(7/54)**

+Due to dilution, sample quantitation limit is affected.  
See dilution table for specifics.

[illegible]
$$T = \text{Total}$$

**Dissolved**

### Action Level Exists

SEE NARRATIVE FOR CODES RESTRICTIONS

06/20/2013

## DELIVERABLE QUALITY CONTROL REVIEW FORM

Document Title: Data Validation - Ontario Air National Guard, ESI☐ Draft ☒ FinalClient: HazwrapTETC Project Number: 928905-01

## REVIEW FINDINGS

## 1. Review against Statement of Work requirements:

☒ Acceptable☐ Not AcceptableC. Ar Pryguny

Signature

Printed Name

14 Oct 92

Date

## 2. Data validation and accuracy of findings:

☒ Acceptable☐ Not AcceptableC. Ar Pryguny

Signature

Printed Name

14 Oct 92

Date

## 3. Editorial quality:

☒ Acceptable☐ Not AcceptableC. Ar Pryguny

Signature

Printed Name

14 Oct 92

Date

4. Comments: HAZWRAP Guidance & CLP 3/90 SOW  
Followed

## QUALITY CONTROL REVIEW VALIDATION

Douglas Hazelwood

Signature

14 October 92

Date

DOUGLAS HAZELWOOD

Printed Name

TECHNICAL DIRECTOR

Title



## MEMORANDUM

**DATE:** October 30, 1992  
**TO:** Carl Giesler  
**FROM:** Judy Kirkland *JAK*  
**SUBJECT:** Data Validation  
Ontario Air National Guard, Site 1  
Expanded Site Investigation

**OVERVIEW:** Four environmental samples were collected from two groundwater monitoring wells. Samples were collected on September 10, 1992.

One field blank, one equipment blank and one trip blank were also collected as part of the overall sampling effort. However, there was one sample received for VOA analyses which was not listed on the chain of custody. The sample was labeled LABPURE. A total of 8 samples were validated. The samples were analyzed for organics, and inorganics (including cyanide), according to what was requested on the chain of custody (COC).

This data package included the following sample delivery group (SDG)(batch numbers) generated by CompuChem:

26194-3 (VOA, SVOA)  
936350 (unfiltered metals)  
936351 (filtered metals)  
261948 (cyanide)

CompuChem Laboratories, Incorporated, in Research Triangle Park, North Carolina performed all of the analyses. Both organic and inorganic analyses were carried out using the March 1990 Contract Laboratory Program (CLP) Statements of Work (SOW) for inorganic and organic analyses.

Data validation procedures outlined in "The HAZWRAP Requirements for Quality Control of Analytical Data", July 1990, were followed. Procedures for Level C data review were followed as requested in the November 1991 ESI work plan for all samples except one, (OANGMW202) for which Level D validation was specified. Under HAZWRAP, Level D is required per the "Region I Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses".



**SUMMARY:** All samples were analyzed as requested on the chain of custody, and were received in good condition.

**BLANKS:** For VOA analyses, the trip blank (OANG-TB5) contained methylene chloride. However, the concentration was less than the contract required quantitation limit (CRQL). Although methylene chloride was not detected in the method blank, it is still possible that methylene chloride could have originated from the laboratory since it is a common laboratory contaminant. Methylene chloride was also detected in two of the samples, but in concentrations less than the CRQL.

The SVOA method blank only contained one lab artifact. This artifact was also detected in the field blank (OANG-FB3) along with a common phthalate ester. The equipment blank (OANG-EB3) contained phenol as well as three different phthalate esters. All analytes detected in the equipment blank and the field blank for SVOA analyses were below the CRQLs.

The method blank for the target analyte list (TAL) metals in SDG# 936350, contained aluminum, calcium, sodium and zinc. These same analytes were also detected in the equipment blank. In addition to those analytes, potassium was also detected in the field blank. The field blank was used to qualify the sample data.

The TAL metals method blank for SDG# 936351 contained contaminants also. The samples were qualified according to the 5 times rule for blank contamination. It must be noted however, that the rule is applied differently for Level C versus Level D validation. Therefore, qualifiers may be different for the same analyte regardless of analyses method.

**CALIBRATION:** With few exceptions, the initial calibration and continuing calibration criteria were met for all parameters analyzed. For 2-Butanone, the initial calibration percent relative standard deviation (%RSD) was out of the control limits. The percent difference (%D) was out of control limits for the continuing calibration of 1,1,2,2-Tetrachloroethane. Since these analytes were not detected in the samples, no qualification of the data was necessary. For inorganic analyses SDG# 936351, aluminum was detected in the continuing calibration blank. The samples were qualified by Hazwrap Level, i.e. Level C for sample OANGMW303 (J), and Level D for sample OANGMW202 (R).

**HOLDING TIME:** Holding times were exceeded by two days for all cyanide sample analyses. Since the samples were properly preserved and cyanide was not detected in any of the samples, the samples were not qualified. The matrix spike/matrix spike duplicate (MS/MSD) samples were extracted out of holding time for SVOA analyses. No samples were qualified based on the missed extraction time since the extraction time was not grossly exceeded.

**FIELD DUPLICATES:** No field duplicates were submitted with this sampling effort.

**MATRIX SPIKES/MATRIX SPIKE DUPLICATES:** The MS/MSD data were checked for percent recovery (%R), as well as RPD. All %Rs were within control limits for VOA analytes. Two SVOA compounds were not within %R limits. Since these limits are only advisory as per the 3/90 SOW, no further action was required by the lab and therefore, no qualification of the data was necessary. For SDG# 936351, the %R for selenium and thallium were low at 54.8% and 74.2% respectively. Since no selenium and thallium results were detected above the instrument detection limit (IDL), the results were qualified as estimated/non-detects (UJ). In SDG# 936350, the %R for selenium was 0%. All data associated with this matrix spike, for selenium only, were qualified as unusable.

All RPDs were within control limits for all parameters analyzed, except nickel, cobalt and arsenic, in SDG# 936350. No qualification of the sample data was necessary for nickel and cobalt since the results were below the IDL for both analytes. Sample OANGMW202 was given a J qualifier because arsenic was detected above the IDL.

It should be noted that for SDG# 26194-3, a blank was used for the MS/MSD instead of a sample. In addition, the MS/MSD were analyzed 8 days after the samples were analyzed. Both of these procedures are not considered to be good laboratory practices.

**TENTATIVELY IDENTIFIED COMPOUNDS:** No tentatively identified compounds (TICS) were detected for VOA analyses. For SVOA analyses, unknown hydrocarbons, an unknown carboxylic acid, and an unknown alkene were detected in sample OANGMW202. A lab artifact was detected in sample OANGMW303. This lab artifact was also detected in the blank. It has been tentatively identified as either acetic acid, (triphenylphosphoranylidene)-, methyl ester or phosphine oxide, triphenyl. The estimated concentration of this laboratory artifact is 5 micrograms/liter. This artifact is currently under investigation by CompuChem.

**LABORATORY CONTROL SAMPLE:** All elements were within the control limits for the laboratory control sample (LCS). No LCS was required for mercury and cyanide analysis. Again, good laboratory practices were not followed for the analysis of the LCS for SDG# 936350. Although the results were within the control limits, this LCS was not analyzed until 2 days after the samples were analyzed.

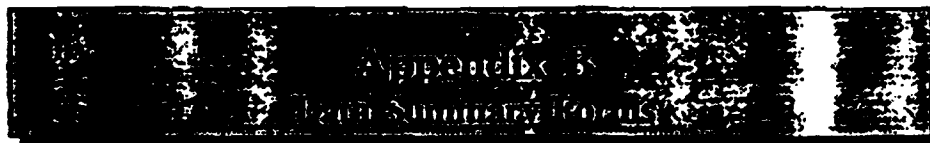
**CONCLUSION:** In conclusion, the data validated for this round of samples should be considered usable, with the exception of the data associated with the out-of-control %R for selenium and the out-of-control continuing calibration of aluminum data mentioned above. It should be noted however, that all of the sample and blank results for VOA and SVOA analyses were below the CRQLs.

Two attachments are included with this report, Appendix A and Appendix B. Appendix A contains a list of the data qualifiers and their definitions. Appendix B contains the Data Summary Forms.

**ATTACHMENTS:** Appendix A Glossary of Data Qualifier Codes  
Appendix B Data Summary Forms

cc: Rob Kravitz

Codes Related to Identification (confidence concerning presence or absence of compounds):		
U	=	Not detected. The associated number indicates approximate sample concentration necessary to be detected.
(No Code)	=	Confirmed identification.
B	=	Not detected substantially above the level reported in laboratory or field blanks.
R	=	Unreliable results. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
N	=	Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.
Codes Related to Quantitation ( can be used for both positive results and sample quantitation limits):		
J	=	Analyte present. Reported value may not be accurate or precise.
J <sub>i</sub>	=	Analyte present. The reported value is estimated because of the presence of interference.
K	=	Analyte present. Reported value may be biased high. Actual value is expected to be lower.
L	=	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
UJ	=	Not detected, quantitation limit may be inaccurate or imprecise.
UJ <sub>i</sub>	=	The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).
UL	=	Not detected, quantitation limit is probably higher.
Other Codes:		
Q	=	No analytical result.



ILLCO NAME: Ontario Air National Guard

9/10/92

WATER SAMPLES  
(7/57)

**To calculate sample quantitation limit:  
(C<sub>90%</sub> + Dilution Factor)**

Sample No.		Dilution Factor		% Moisture		Location	
CRCL	CONC'D	Result	Q	Result	Q	Result	Q
10	Chloroethane						
10	Bromoethane						
10	Vinyl Chloride						
10	Chloroethane						
10	Methylene Chloride	1	3	1	8	1	7
10	Acetone						
10	Carbon Disulfide						
10	1,1-Dichloroethane						
10	1,1-Dichloroethane						
10	Total 1,2-Dichloroethane						
10	Chloroform						
10	1,2-Dichloroethane						
10	2-Butene						
10	1,1,1-Trichloroethane						
10	Carbon Tetrachloride						
10	Vinyl Acetate						
10	Bromochloroethane						

**ENR2 - Contract Required Quantitation Limit**

### Action Level: Existence

SEE NARRATIVE FOR CODE DEFINITIONS  
 revised 07/92

DATA SUMMARY FORM: VOLATILES 2

Site Name: Ontario Air National Guard

Case #: 26943 Sampling Date(s): 9/10/92

WATER SAMPLES  
(µg/L)

To calculate sample quantitation limit:  
(CQL = Dilution Factor)

Sample No. Dilution Factor Location		Result									
CQL	CONC	1,2-Dichloroethane									
10	10	Cis-1,3-Dichloropropene									
10	10	Trichloroethene									
10	10	Dibromochloromethane									
10	10	1,1,2-Trichloroethane									
10	10	Benzene									
10	10	Trans-1,2-Dichloroethene									
10	10	Bromoform									
10	10	4-Methyl-2-pentanone									
10	10	2-Hexanone									
10	10	Tetrachloroethene									
10	10	1,1,2,2-Tetrachloroethane									
10	10	Toluene									
10	10	Chlorobenzene									
10	10	Ethylbenzene									
10	10	Styrene									
10	10	Total Xylenes									

CQL = Contract Required Quantitation Limit      Action Level Exists      SEE NARRATIVE FOR CODE DEFINITIONS      revised 07/92

Ontario Air National Guard

26/01/92  
: (S) Date Settlement :  
£ 34795.14  
26/01/92

(7/67)  
WATER SALES

**To calculate sample quantitation limit:  
(C<sub>LOQ</sub> = Dilution Factor)**

Sample No. Dilution Factor Location		Result	Result
10	Phenol		
10	bis(2-Chloroethyl) ether		
10	2-Chlorophenol		
10	o-1,3-Dichlorobenzene		
10	o-1,4-Dichlorobenzene		
10	1,2-Dichlorobenzene		
10	2-Methylphenol		
10	bis(2-Chloroisopropyl) ether		
10	4-Methylphenol		
10	N-Nitroso-N-methylamine		
10	Hexachlorocyclopentadiene		
10	Nitrobenzene		
10	Isophthalic acid		
10	2-Nitrophenol		
10	2,4-Dinitrophenol		
10	bis(2-Chloroethoxy)methane		
10	2,4-Dichlorophenol		
10	1,2,4-Trichlorobenzene		
10	Nitrothiophene		
10	4-Chlorophenol		

**CRQL - Contract Required Quantitation Limit**

**Action Level Exists**

SEE NARRATIVE FOR CODE DEFINITIONS  
Revised 07/92



G-46

DATA SUMMARY FORM: B N A S 2

Site Name: Ontario Air National Guard

WATER SAMPLES  
(µg/L)

Case # 8-0619-3 Sampling Date(s): 9/10/92

To calculate sample quantitation limit:  
(CQL = Dilution Factor)

CQL	Sample No. Dilution Factor Location	Result Q Result Q									
		10	10	10	10	10	25	10	25	10	25
	1,2,4-trichlorobenzene										
	1-Chloro-3-methylphenol										
	2-Methylnaphthalene										
	1,2,4-trichlorobenzene										
	2,4,6-trichlorophenol										
	2,4,6-trichlorophenol										
	2-Chloronaphthalene										
	2-Nitroaniline										
	1-Methylphthalate										
	Acenaphthylene										
	2,6-Dinitrotoluene										
	3-Nitroaniline										
	Acenaphthene										
	2,4-Dinitrophenol										
	4-Nitrophenol										
	Dibenzofuran										
	2,4-Dinitrotoluene										
	1,2-Dichlorobenzene										
	4-Chlorophenyl-phenylether										
	Fluorene										
	4-Nitroaniline										
	4,6-Dinitro-2-methylphenol										

CQL = Contract Required Quantitation Limit

SEE NARRATIVE FOR CODE DEFINITIONS  
revised 07/92

NOV 02 '92 12:07 ET

Site Name: Ontario Air National Guard

Base # 26913 sampling date(s): 9/10/92

DATA SUMMARY FORM: S M A S

1

WATER SAMPLES  
(µg/L)

To calculate sample quantitation limit:  
(CAGL \* Dilution Factor)

CAGL	CONFOUND	Sample No. Dilution Factor Location	Result Q Result Q Result Q Result Q Result Q Result Q Result Q Result Q Result Q									
			1	2	3	4	5	6	7	8	9	10
10	N-Nitrosodiphenylamine											
10	4-Bromophenyl-phenylether											
10	Hexachlorobenzene											
25	Pentachlorophenol											
10	Phenanthrene											
10	Anthracene											
10	Carbazole											
10	Di-n-butylphthalate											
10	Fluoranthene											
10	Pyrene											
10	Butylbenzylphthalate											
10	3,3'-Dichlorobenzidine											
10	Benzo(a)anthracene											
10	Chrysene											
10	Bis(2-Ethylhexyl)sebacate											
10	Di-n-octylphthalate											
10	Benzo(b)fluoranthene											
10	Benzo(k)fluoranthene											
10	Benzo(a)pyrene											
10	Indeno(1,2,3-cd)pyrene											
10	Benzof(a,h)anthracene											
10	Benzo(g,h,i)perylene											

CAGL = Contract Required Quantitation Limit

Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS  
revised 07/92

DATA SUMMARY FORM: INORGANICS

Site Name: Ontario Air National Guard

WATER SAMPLES  
(µg/L)

Case #: 926350 Sampling Date(s): 9/10/92

+Due to dilution, sample quantitation limit is affected.  
See dilution table for specifics.

unfiltered unfiltered

Sample No. Dilution Factor	Location	Result	Q	Result	Q	Result	Q	Result	Q
CDL	ANALYTE								
100	Aluminum	87.4		49.1		13400		4850	
60	Antimony			8.4		15		4.7	
10	Arsenic					132		83.6	
200	Barium								
5	Beryllium								
5	Cadmium								
500	Calcium	67.4		82.1		4900		47100	
10	Chromium					23.5		17.5	
50	Cobalt								
25	Copper					13.7		6.2	
100	Iron					12800		400	
3	Lead					6.4		3.3	
500	Magnesium					13100		1100	
15	Manganese					2.8		98.6	
0.2	Mercury								
40	Nickel								
500	Potassium			196		410		2440	
5	Selenium								
10	Silver								
500	Sodium	466		351.5		16800		16800	
10	Thallium								
50	Vanadium					98.8		80.0	
20	Zinc	62.2		72.8		125		109	
10	Cyanide								

\*Action Level Exists

SEE NARRATIVE FOR CODE DEFINITIONS

DATA SUMMARY FORM: I N O R G A N I C S

Site Name: Ontario Air-National Guard

WATER SAMPLES  
(µg/L)

Case #: Q26351 Sampling Date(s): 9/10/92

\*Due to dilution, sample quantitation limit is affected.  
See dilution table for specifics.

Filtered Filtered

Sample No.	Dilution Factor	Location	Result	Result
CRDL		ANALYTE		
100.		Aluminum	345	114
60		Antimony		
10		*Arsenic	4.3	3
200.		Barium	43.3	47.2
5		Beryllium		
5		*Cadmium		
500		Calcium	6000	4500
10		*Chromium	7.6	7.2
50		Cobalt		
25		Copper	5.6	7.9
100		Iron	282	8
3		*Lead		
500		Magnesium	11000	10100
15		Manganese	58.8	142
0.1		Mercury		
40		*Nickel		
500		Potassium	1760	1720
5		Selenium	103	43
10		Silver		
500		Sodium	1700	16900
10		Thallium	163	15
50		Vanadium	10.0	11.1
20		Zinc	42.1	42.4
		*Cyanide		

SEE NARRATIVE FOR CODE DEFINITIONS  
revised 07/90

\*Action Level Exists

## DELIVERABLE QUALITY CONTROL REVIEW FORM

Document Title: Ontario Air National Guard ESI  
Data Validation Report

( ) Draft (X) Final

Client: HAZWAP

TETC Project Number: 928905-01

## REVIEW FINDINGS

## 1. Review against Statement of Work requirements:

[X] Acceptable O. A. Propper Signature  
[ ] Not Acceptable \_\_\_\_\_ Printed Name  
30 October 92 Date

## 2. Data validation and accuracy of findings:

[X] Acceptable O. A. Propper Signature  
[ ] Not Acceptable \_\_\_\_\_ Printed Name  
30 October 92 Date

## 3. Editorial quality:

[X] Acceptable O. A. Propper Signature  
[ ] Not Acceptable \_\_\_\_\_ Printed Name  
30 October 92 Date

4. Comments: Both Data level C & D used in this  
report. Qualifiers vary with each level and  
care should be taken when interpreting the  
associated data.

## QUALITY CONTROL REVIEW VALIDATION

Douglas Hazelwood Signature 2 November 92 Date  
DOUGLAS HAZELWOOD Printed Name  
TECHNICAL DIRECTOR Title